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Improvement in Machinery for Getting Out Ship Timber.

The invention of the saw has been ascribed by Pliny to Dædalus; but it has been traced to much higher antiquity—the age of the fourth dynasty of Egypt. In sawing, the Egyptians used a large hand-saw: they frequently fixed the wood upright, secured by pins in lieu of a vise, or with pins passing through the piece of timber itself, in order to support the planks as they were cut apart; which is the practice of modern sawyers.

The old mode of making boards was to split up the logs with wedges; and, inconvenient as the practice was, it was no easy matter to persuade the world that the thing could be done in any better way. Saw mills were first used in Europe in the 15th century; and in the year 1555, an English ambassador, having seen a saw mill in France, thought it a novelty which deserved a particular description. It is amusing to see how the aversion to labor-saving machinery has always agitated England. A saw mill was erected in Lambeth (on the site of Lambeth water works), in Cromwell's time, and which he protected by Act of Parliament. Another saw mill was established by a Dutchman, in 1663; but the public outcry against the new-fangled machine was so violent, that the proprietor was forced to decamp. The evil was thus kept out of England, for several years, or rather generations; but in 1768 an unlucky timber merchant, hoping that, after so long a time, the public would be less watchful of its interests, made a rash attempt to construct another mill. The guardians of the public welfare, however, were on the alert, and a conscientious mob at once collected and pulled the mill to pieces!

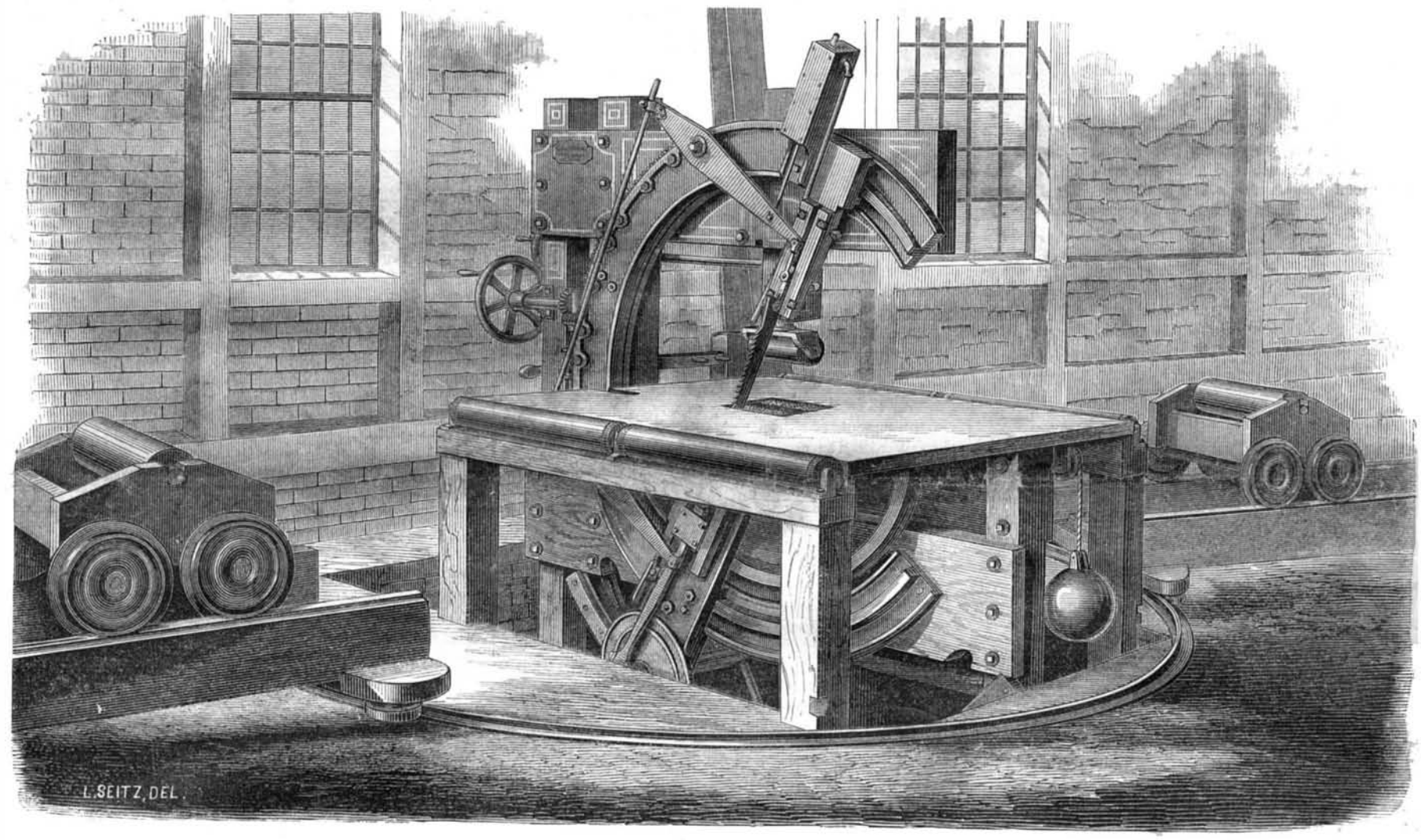
The business of the ship-carpenter has received probably less aid from the application of machinery and the inventive talent of the world than any other of general inportance; hand tools, as the adze, hewing ax, hand-saw, auger, and pit-saw being the chief reliances for shaping the timbers and dressing the planking of a ship. Compared with other departments of manufacturing industry that of shipbuilding has remained so nearly stationary, amid the general progress of others, that the workman who toiled at the building of the *Blessing of the Bay* more than two hundred years ago, would, if he should return to his old haunts and occupation, find no difficulty in using the tools now employed, and, apart from the greater dimensions of our ships, no great change between the appearance of our shipyards and those of the "good old colony times." Yet the number of ships built and the amount of tunnage employed is recognized as an index of the prosperity of the nation, and while peculiar circumstances in the condition of a country may, for a time, compel a cessation of the enterprise under more favorable circumstances directed into this channel, these hindrances may be partly, at least, overcome by increased facilities and superior advantages of performing the work.

A valuable auxiliary to the labors of the ship-builder is shown in the accompanying engraving. It is a gig or scroll saw, capable of cutting plank or heavy timber at any angle, sawing and shaping the faces, edges, and ends of timber and plank, "insquare" knees, etc., having a sweep of 270° out of the 360°. The feed motion allows the sawyer to cut curves without handling the timber. It will saw any bevel or curve, and cross-cut at any angle, and is completely under the control of the operator. The frame is so constructed as to admit curved timber of the largest dimensions, and trucks are provided, running on curved and radial tracks, for sustaining the weight of the timbers and guiding their presentation to the saw. With the aid of two attendants it will do the work of 40 men usually employed in shipyards, and do the work exact and therefore well, wasting only the sawdust and the small pieces not capable of being used for building purposes, and saving the enormous waste in chips made by hewing and dressing. More than one knee can, by its aid, be made from the same original piece.

The saw occupies a space of only seven feet by eight for the frame, and room for the trucks to work when in use. It is not liable to get out of order and may be used for years with little cost for repairs. One in use at the Philadelphia navy yard has been run two years and six months costing but $7·50 for repairs during that period. The power required to run one of the 12-inch saws is about four horse power. Any man of ordinary intelligence can use the machine and become expert to handle and cut all kinds of timber. A correspondent says: "I have seen at the Philadelphia navy yard a 'half top' finished in eight minutes. It was of southern live oak, ten feet long and ten inches thick. By hand labor half a day would have been required. A knee eight feet long and seven inches thick was finished in ten minutes, whereas it would have been considered a good two days' work if done in the ordinary manner." All the framing, knees, and in fact all the timbers of the sloop of war *Omaha*, built at this yard, were sawed by this machine. All the tops, half tops, timbering, and planking of the *Brooklyn*, Admiral Farragut's flag ship at the attack on New Orleans, now being rebuilt at this yard, are being cut by this saw. One just completed for this yard, with improvements over those first built, cuts planks, both edges, to any bevel or scroll required, and will cut a plank 50 feet long and eight inches thick, both edges, in less than five minutes. The plank then needs no touch of ax, adze, or plane before being placed on the ship. This is an advantage, as sawed surfaces retain the oakum better than planed surfaces. Mr. J. W. Lynn, of Philadelphia, who has used them for months, says that "with the aid of two saws he can save the labor of 50 or 60 men in the construction of a ship."

The machines are in use at Neafie & Levy's, Cramp & Sons', J. W. Lynn's, Birely, Hillman & Streaker's, Philadelphia, the Philadelphia, Portsmouth, and Charlestown navy yards, at S. Stevens' works, Chester, Pa., Mudgett, Libby & Griffin's works, Stockton, Me., and a number of other well-known yards. One will be running early in February, at the Camden and Amboy R. R. shops, Hoboken, N. J.

The machine was patented through the Scientific American Patent Agency April 7, 1868, by John L. Knowlton. All communcations should be addressed to the agent, Theo. F. Taylor, 532 Walnut st., Philadelphia, Pa., or to the inventor at his works, 130 Reed street, same city.



KNOWLTON'S PATENT CIRCULAR BEVEL SCROLL SAW.

Coal Ashes as a Fertilzer.

A series of experiments conducted at the Museum of Natural History, Paris, during the past year, by Professor Naudin, on the value of coal ashes as a fertilizer, has resulted in the conclusion that they are neither a manure nor even earth of the most infertile quality. An opinion to this effect has prevailed in this country pretty generally, but it is certain that upon heavy clays, they act as a disintegrator if nothing else. This effect is not, we are convinced, merely mechanical, as a very small amount of coal ashes is sufficient to destroy the adhesiveness of a large amount of clay. At least this was the case in a recent experiment of our own, tried in accordance with the advice of one of the most accomplished florists in New York State. By the application of sifted coal ashes with a very small proportion of well rotted horse manure, we were able to make a thrifty flower garden the first season upon one of the stiffest soils it has ever been our lot to own.

AN Italian chemist is said to have invented a process whereby wood, cloth, and other inflammable material are rendered absolutely fire-proof, and which is free from the objections which attend the use of other processes. The details are not yet given.

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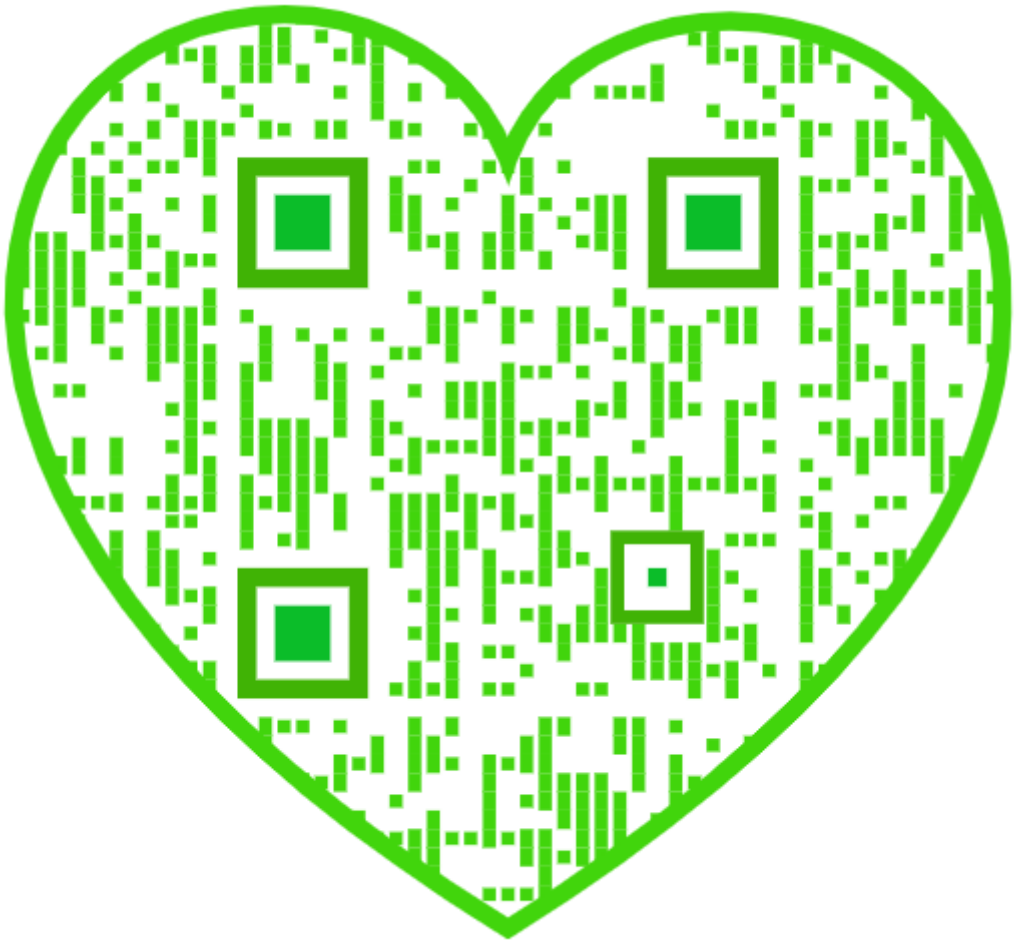

THE CHEMISTRY OF THE HEATON PROCESS.

The importance of the various questions that have been raised in reference to the method proposed by Mr. Heaton for making steel is sufficiently great to justify some further remarks on the subject from a chemical point of view, especially as the account which has been given of it in this respect is not by any means exhaustive. The statements in Dr. Miller's report that the method is based upon correct chemical principles, and that the mode of attaining the result is both simple and rapid, cannot for a moment be questioned, but it appears that the opinion thus expressed by such an eminent chemical authority has lent a sanction to the wider claims made as to the metallurgical importance of Heaton's process, and to have given it an apparent *raison d'etre* which is not all consistent with the only chemical data yet available for forming a judgment as to the *rationale* of this method, and its practical value for making steel. The merit claimed for this method is that it is applicable for the production of steel from those kinds of pig iron which are of inferior quality, in so far as they contain considerable amounts of phosphorus and sulphur, the presence of those substances disqualifying them for conversion into steel by the Bessemer process. It is unnecessary here to refer particularly to the chemical principles on which this method is based; the main question is as to the result, and a careful examination of the chemical data hitherto published to elucidate that result is, alone, calculated to confirm and justify much of the adverse comment which Heaton's method has called forth.

Taking in the first instance the crude steel as it is obtained from the converter, there can be no question that it is a material differing very widely from that constituting the steel ingots obtained by the Bessemer process. One of the chief merits of the latter material is the homogeneity which it acquires by being run from the converter in a molten state, and being thus thoroughly freed from intermixture of slag. The texture, malleability, and tensile strength of the metal are in a great measure dependent on this homogeneous condition, and on the absence of minute portions of slag separating the metal into laminæ. The steel made by Heaton's method is professedly solidified in the converter, probably made during the process of conversion, and is consequently inter-penetrated with particles of slag just in the same way that a puddled bloom is. Dr. Miller's analyses indicate considerable differences as existing between the crude metal from the converter and the same metal after being forged and rolled. Thus, for instance, the crude and rolled metal contains for one hundred parts of iron as follows, according to the analyses:

	Iron.	Carbon.	Silicon.	Sulphur.	Phosphorus.	Arsenic.	Manganese.	Calcium.	Sodium.	Total.
Crude.....	100	1·855	·274	·018	·308	·043	·093	·329	·148	3·06
Rolled.....	100	1·011	·151	trace	·297	·024	·089	·315	trace	1·887
Difference..	....	·844	·123	·018	·011	·018	·004	·014	·148	1·180

According to these data, the impurities in the crude metal would appear to be separated in the operation of rolling to the extent of one-third their total amount. But so far as the composition of mill furnace slags is known, there is nothing to warrant the opinion that there would be such an elimination of phosphorus and silicium as the above analyses apparently indicate. In fact, there is every reason to suppose that the several impurities there specified did not exist as silicon, phosphorus, sodium, and calcium combined with iron, but that they were combined with each other in an oxidized condition, as the constituents of a small quantity of slag which was mechanically disseminated throughout the metal, and was partially squeezed out in the operation of rolling. According to this view, the slag thus separated from 100 parts of iron would consist of:

Silica	·263 =	Silicon	·123
Sulphuric acid	·045 =	Sulphur	·018
Phosphoric acid	·025 =	Phosphorus	·011
Arsenic acid	·027 =	Arsenic	·018
Manganese oxide	·007 =	Manganese	·004
Lime	·019 =	Calcium	·014
Soda	·199 =	Sodium	·148
	.585		

and its per centage composition would be as follows:

Silica	45·106
Soda	23·325
Lime	3·360
Manganese Oxide, Mn_2O_3	1·217
Sulphate of soda	13·718
Phosphate of soda	7·887
Arseniate of soda	5·489
	100.

If the silicon, phosphorus, calcium, etc., in the rolled metal be also regarded as being wholly or partly in the state of slag, it would be more easy to conceive that the metal should have the characters assigned to it by Mr. Kirkaldy. For although it is not specifically stated by Dr. Miller that the metal experimented on by Mr. Kirkaldy had the same composition as the rolled steel analyzed by Dr. Miller, that is, no doubt, implied, and it is quite inconsistent with the hitherto received views that steel containing so much as nearly $\frac{3}{10}$ per cent of phosphorus should have such tensile strength as the metal operated upon by Mr. Kirkaldy. The presence of so much as $\frac{3}{10}$ per cent of calcium also renders it very probable that the metal really contained an admixture of slag. If that be the case, it would be natural to expect that the metal would be very liable on that account to corrosion, and that its tensile strength and coherence would be in time considerably reduced.

In reference to the amount of nitrate requisite to produce steel by Heaton's method from iron having the composition indicated by Dr. Miller's analyses, it is very evident that 10 per cent of nitrate of soda would not suffice to effect the separation of the phosphorus and sulphur to the extent that they were separated in the experiment. The minimum amount requisite for this purpose would be 16·6 per cent of the iron, or at the rate of about 2·4 cwt. per tun of pig iron, that being the proportion actually employed in Dr. Miller's experiments. In considering this point it is necessary to remember that the yield of crude metal from the converter was augmented to the extent of from 7 to 10 per cent by the melting of the cast-iron plate used for keeping down the nitrate, and if this plate consisted of pure cast iron free from phosphorus and sulphur, it would have a proportionate effect in making the influence of the nitrate, in separating those substances from the pig iron, appear greater than it really was. Whatever may have been the case with regard to this point, it would appear that Mr. Heaton must be in error in stating that 10 per cent of nitrate would be sufficient for converting a tun of pig iron, at least, if it contained the same amount of phosphorus, sulphur, etc., as the pig iron analyzed by Dr. Miller, and so far as chemical principles will admit of the necessary amount being determined. No doubt ten per cent or less might be sufficient for iron of superior brands; but that would have no value in regard to the applicability of this method for making steel from Cleveland iron and other kinds, in which the amount of phosphorus and sulphur is not generally less than those given by Dr. Miller, as being contained in the Stanton and Clay Lane pigs.

According to Mr. Miller's analysis of the slag produced in the conversion of the pig iron into crude steel, and adopting his estimate that this slag amounted to 23 per cent of the pig iron, as the maximum, there would have been separated from pig iron, contain 100 parts of iron, the following amount of impurities:

Silicon.	Phosphorus.	Sulphur.	Iron.
·7	·74	·12	3·15

Referring now to the analyses of the pig iron and of the crude steel, it appears that the difference between them was as follows:

	Iron.	Carbon.	Silicon.	Sulphur.	Phosphorus.	Arsenic.	Manganese.	Calcium.	Sodium.
Pig Iron....	100	3·067	3·196	·122	1·576	·044	·344		
Crude Steel.	97·026	1·8	·266	·013	·297	·039	·060	·319	·144
Separated..	2·974	2·267	·930	·104	1·278	·005	·254	....	....
In Slag.....	3·15	....	·700	·120	·742	....	....	....	....

Taking the slag as amounting to 23 per cent of the pig iron, the amounts of silicon and sulphur in the slag agree tolerably with the amounts of those substances separated from the pig iron, but the amount of phosphorus is singularly enough only about one-half that which would appear to have been separated from the pig iron. This is the more remarkable, firstly, since there is little reason to suppose that in the presence of such a basic slag there could have been any volatilization of phosphoric acid, which is a remarkably fixed substance, and, secondly, since the slag, according to the data given in the report, would not appear to have amounted to much more than 16 per cent of the pig iron, instead of 23 per cent

Altogether, then, it is evident that the *rationale* of this method is involved in much obscurity, and that from a chemical point of view there is room for considerable doubt as to what is really the result obtained by its application to pig iron containing phosphorus and sulphur.

These circumstances alone certainly justify the demand for much fuller information than has yet been furnished, so that a fair opportunity may be afforded of arriving at a correct estimate of the method.—*Engineering.*

ANNUAL REPORT OF THE COMMISSIONER OF PATENTS.

United States Patent Office,
Washington, D. C., January 20, 1869.

Sir:—During the year ending December 31, 1868, there have been filed in the Patent Office 3,705 caveats, and 20,445 applications for patents; 12,959 patents have been issued, 419 have been reissued, and 140 extended.

Compared with other years, the business of the office has been greater than that of any preceding period. The number of patents issued has been more than double the number of 1865, and more than three and one-half times that of 1858.

Since the Patent Office was first established its business has had a rapid growth in amount and in importance. In 1836, eight or ten persons were enough to transact all its business. Now between three or four hundred are required.

This increase has arisen in part from the growth of the country, but more from the stimulus that our patent laws have given to invention. The rewards which they have held out for successful improvements have increased in value with the progress of the country and with the more proper appreciation and greater security of patented property. A really successful invention now brings to its author a competency for life; and, as a consequence, the efforts of almost every class in the community are directed in search of useful improvements.

In all those improvements in life to which patent laws relate, our own age has witnessed more advance than all the preceding ages of the world taken together. One improvement seems to have begotten another. New fields for exploration have been constantly opening, and so far from reaching any limit to invention, we seem but on the way to other advances and improvements beyond our present comprehension

I am, however, unable to attribute the extraordinary increase of the last few years in the number of patents issued to an equal increase of real improvements; for I apprehend that much of apparent prosperity has arisen from the allowance of patents that should never have been granted.

Several causes have contributed to this:

1st. A practice has recently grown up of subdividing inventions and issuing several patents for what was formerly embraced in one. It has served to increase the receipts of the office, but at the same time it has greatly increased the expenses of the inventor, not only for office fees, but for all the other expenditures incurred in obtaining patents. Had the practice been confined to separate and distinct improvements upon different parts of a machine, no exception could be taken to it; but it has been carried to the extent of several patents for the same invention, and patents for parts, which taken alone constituted no invention. It has tended to complicate and confuse patented rights, and, in some instances, I apprehend, been a source of frauds upon the public. I am not aware of any useful purpose that it has served, and believe it should be regarded with disfavor.

2d. Ample provisions have been made from time to time to guard against the improper rejection of applications for patents. In case of a refusal, the examiner in charge must assign his reasons for it, and specifically point out and refer the party to any previous device which, in his view, anticipates the invention. These grounds the applicant may controvert and have a second examination and a second decision. If still rejected, he may appeal to the board of examiners-in-chief, and have their investigation and decision upon his case. From the examiners-in-chief he may appeal to the Commissioner in person, and from the Commissioner to one of the judges of the supreme court of the District of Columbia.

An examiner's action receives no such scrutiny when he allows a patent. If he be pressed for time, or be indifferent as to his duties, he may put an end to his labors by a simple indorsement. If he lacks capacity, there will then be no exposure of his ignorance or of the unsoundness of his views. It may have happened that in some instances the allowance of patents has served to cloak incapacity and indifference to duty.

I have endeavored to provide some means for reviewing briefly favorable decisions before patents were issued upon them, but found that the force in the office was inadequate to such work in addition to the performance of other indispensable duties. The only reliance we have to guard against the issue of improper patents is upon the ability and integrity of examiners and their assistants.

3d. The great increase of the business of the office has not been accompanied with a corresponding increase of the examining corps. Examiners, in some cases, have had thrown upon them an amount of labor they could not perform well and, from the necessity of the case, patents have been hurriedly allowed without the full investigation they should have received. Formerly thirty or forty cases per month were deemed to be as many as an examiner with an assistant could thoroughly investigate and decide. Now it is not unusual for the same examiner, with two or three assistants, to dispose of as many as two hundred cases in the same time. In one room during the past year more applications have been decided than by the whole office in 1855, or in any previous year.

The granting of improper and illegal patents defeats every object and purpose of patent laws. It serves to mislead and deceive the public, and to subject them to the annoyance of unjust and invalid claims. It throws distrust and discredit upon patented property, and injures the salable value of meritorious inventions. Did the practice of the office fully accord with the intent of the law, and its investigations command the entire confidence of the community, so that business operations and the investment of capital could with safety be founded upon them, it would do more to enhance the rewards which the laws contemplate for valuable improvements than any other measure that could be devised.

To improve the qualifications of examiners, and obtain a high order of ability in the examining corps, has been deemed by me an object of the first importance—one, indeed, upon which the success of the office greatly depended.

A committee of three gentlemen, selected for their ability and fitness for the purpose, was appointed to examine into the qualifications of such of the employés as had received their appointments without the examinations required by law. The duty has been, so far, faithfully and judiciously performed, and several changes in the office have resulted therefrom.

Great care has been exercised in supplying vacancies. The positions of examiners' clerks and assistants have been regarded as the schools of the office, in which to qualify gentlemen of ability and culture for higher places; and the qualities sought for in appointees to those positions have been such as, in due time, will make them able and well-instructed examiners.

Questions as to the patentability of inventions become more difficult with the increase in the number of previous devices. An examiner must familiarize himself with all the inventions that have been made in his class—not only in this country, but in Europe. Their great number and complexity have rendered the study of them a profession to be acquired by years of labor. An examiner's decisions involve nice questions of law, of science, and of mechanics. The more recondite principles upon which depend the practical success of processes and machinery, must be familiar to him. Large amounts of property often depend directly or indirectly upon his action. The ability and acquirements necessary to the proper discharge of his duties must be of a high order—scarcely less than those we expect in a judge of the higher courts of law.

I have been strongly impressed with the belief that the salaries now paid these gentlemen are inadequate to procure

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and retain the best services. They were prescribed in 1848 At that time they would obtain of all the necessaries and conveniences of life more than double of what the same money will purchase now. For all practical purposes it is the same as if those salaries had been reduced one-half. As a consequence, gentlemen who have become experienced and expert in the performance of their duties, resign their places for more lucrative employments. Within the short time that I have been connected with the office, several whose services were invaluable, have resigned, and it is apprehended that others will follow their example. I think I know the wishes of inventors well enough to say that, if the sums they now pay into the Patent Office are insufficient, they would gladly increase them to secure prompt and correct action upon their cases

The reduction in the value of the currency has also operated with hardship upon other employés of the office. So long as the funds of the office admit it without tax on the country, it is believed that their salaries should be made to approximate what they were before 1861.

The act of Congress relative to the Patent Office passed in July, 1836, provided for a machinist at a salary of $1,200 per year. For several years thereafter this was construed to mean a real mechanic to repair and keep in order the models deposited in the office. Afterwards it came to imply a clerk to take charge of the model room. For many years past there have been few or no repairs of breakages and other injuries to models, and large numbers of them are now more or less damaged; some have been totally destroyed. To put them in proper order will require the labor of two men for several years.

Injuries should be repaired at the time they are done, and the persons causing them held accountable therefor. To do such work, and keep in repair furniture, and other articles used in the office, would occupy two men continuously.

Certified copies for models are frequently ordered to be used in courts and for other purposes. To supply them the models are sent to some of the machine shops in the city. Questions involving large interests sometimes depend upon features shown in these models. They lose their force as testimony when suffered to go beyond the supervision of the office. Suspicions of changes have, in some instances, been strongly entertained.

It is believed that the interests of the office will be promoted by establishing within it a machine shop and employing competent persons to do the work I have indicated.

Notwithstanding the ample room for models in the Patent Office, the cases to hold them are now filled, and some of them crowded. More provision for them will have to be immediately made. By narrowing a little the present cases, an additional one may be placed between them and still leave sufficient space for passages. Another shelf may be added and some of the cases lengthened. By these means their present capacity may be more than doubled, and that will meet the wants of the office for many years to come. The time will eventually arrive when the models of those machines that have proved useless will have to be selected out and discarded.

It is recommended to employ a few men in the office to alter these cases and make new ones as fast as the wants of the office shall require and its funds permit.

The subject of copying the drawings of patented devices is one of much importance to the office. There are now about 85,000 of them, and they increase at the rate of about 14,000 per year. There are also about 30,000 belonging to rejected applications. They are kept in drawers in what is called the draftsman's room. There the examiners and their assistants resort to make their investigations. By long experience in examining drawings, they acquire the habit of readily detecting in them any device that may anticipate an invention. Those that are deemed pertinent to the subject of inquiry are taken to the examiner's rooms and submitted to the inspection of parties interested. On appeals they are used in the room of the examiners-in-chief, in the Commissioner's room, and by the judges of the supreme court of the District. For the purpose of being copied for the annual report, and for other purposes, they are also taken from the draftsman's room. Sometimes 2,000 or 3,000 are absent from their places, and this has led to errors much to be regretted on the part of examiners.

Were all the drawings which each examiner has to consult bound in volumes, and placed in his room, convenient for him to study and refer to without leaving his desk, it is estimated that he could dispatch twice as much business as he now does, and with greater accuracy and freedom from mistakes.

The great number of examiners and their assistants who have to resort to the draftsman's room for investigations, and the liability of drawings getting misplaced by accident or by design, have rendered it imperatively necessary to the proper despatch of business to exclude the public from that room. Patent agents and attorneys are thus deprived of their most ready means of investigating the novelty of inventions, and properly preparing specifications for patents. A convenient room for them, provided with copies of drawings, specifications and other works of reference, would be a great convenience to the public, and promote the interests of the office.

Some of the drawings by long use have been much worn, and parts of them obliterated. Unless copied in time they will be lost.

Twenty copies of each specification are now printed. Were there copies of drawings to accompany them, they could be furnished to public libraries, where investigations could be made without the necessity of resorting to Washington.

The Patent Office makes exchanges of its publications with several foreign governments. From Great Britain we receive full copies of their specifications and drawings. In our library we can investigate an English invention as well as can be done in the Patent Office of Great Britain. The volumes are handsomely bound and now fill a large room in the library For them we make but the poor return of a copy of our annual report.

The copies of drawings ordered and paid for by the public now number about 700 per month, and the expense to the office of making them is about $1,400 per month. A reduction of price would probably much increase the number.

Several plans have been proposed for making these copies. Were there as many as fifty of each drawing wanted, the new art of photo-lithography would afford by far the best and cheapest means. It makes a fac-simile of line-drawings, of any size desired, and when once the stone is prepared copies may be taken with little expense. Specimens have been furnished the office which show the wonderful perfection to which this important art has attained. The only difficulty in the way lies in the great uumber of drawings to be copied. Without reference to those on hand, the current issues will amount to nearly fifty a day. At the low rate of ten cents apiece, without any charge for specifications, fifteen or twenty thousand per year would cost more than many libraries could well expend for them; and the fifty or sixty large volumes annually which they would make would soon require more room than many libraries would have to spare.

For a few copies, enough for the use of the Patent Office, ordinary photography, or some of the late processes, would afford a cheaper means of supplying them.

A photographic establishment in the Patent Office, adapted to copying drawings of large size, would supply the orders for them much more cheaply and accurately than by the method of tracing heretofore pursued.

The receipts of the Patent Office from July last to the 1st of January have exceeded its expenditures by about $53,000. It is confidently expected that for the year to come the excess will not be less than $100,000. By strict economy and system in the management of the office, it is believed that salaries may be raised, necessary changes and improvements made, and every needful expenditure to raise the office up to its highest state of efficiency and usefulness incurred, without any charge or tax upon the public.

The large and growing business of the Patent Office has thrown more labor on the Commissioner than any one person can perform. As some relief, it is recommended that appeals from the board of examiners-in-chief be made directly to the chief justice of the supreme court of the District of Columbia.

The Act of Congress relating to the Patent Office, passed March 2, 1861, I have regarded as abolishing all fees on appeals from the Commissioner; and, since examining the subject, I have not felt myself authorized to receive or to pay over to the judges of the supreme court of the District the moneys they have been accustomed to receive for the hearing of such appeals. A different view of the act has been taken by one at least of the judges. It is important that the question should be settled; and it is respectfully submitted that it will be more in accordance with the general practice of the country, and better suited to the dignity of the court, to increase the salary of the judge performing the duties than to make his compensation dependent upon the business that comes before him.

The business of the Patent Office has outgrown the several acts creating it. It is difficult to find authority for the employment of several of its important and indispensable officers. The gentleman who superintends the preparation of abstracts and drawings for the annual report was appointed as an examiner. The Commissioner's assistant has the grade and compensation of a first assistant examiner. The gentleman who purchases the supplies of the office, and upon whom its expenditures greatly depend, is but a temporary clerk. More than one-half of the employés of the office are temporary clerks—an office intended by statute for copyist merely. A revision of the several acts, with proper amendments, would conduce much to the interests of the office and the convenience of the public.

I have deemed it advisable to make several changes in the practice of the office with a view of simplifying its proceedings and producing more accuracy and promptness in its business. As was to be expected, some inconvenience was at first felt; but experience has justified the changes, and with few exceptions they are now universally approved and commended. System and accountability have been introduced in reference to the expenditures of the office. The mode of receiving and accounting for moneys paid into the office has been entirely changed, and such checks provided as will, it is hoped, prevent mistakes and errors. In reference to applications for patents, the principle adopted is to aid and assist the applicant in obtaining what properly belongs to him rather than to obstruct or delay him. The objects of our patent laws will, it is believed, be best attained by securing to each inventor, with as little expense and trouble as possible, the full benefits of his invention so far as he may be entitled to them.

Respectfully submitted: ELISHA FOOTE,
Commissioner.

Hon. BENJAMIN F. WADE.
President pro tem. U S. Senate.

BOILER EXPLOSION AT ELIZABETHPORT, N. J.

Our valued correspondent, Mr. F. W. Bacon, has made an examination of the circumstances attending the late disastrous boiler explosion at Elizabethport, N. J., and we condense from his report the following facts:

The boiler is 20 feet long, three feet diameter, with two 12-in. flues—heads ¼, full, flat; above the flues the heads were stayed by two stays to the shell; below the flues, as is usual, no stays. The iron laminated, and of good quality, or, at least, as good as is usually put into boilers, with the exception that it was not well welded in the laminæ.

The front head under the flues parted in the angle of the flange turned to rivet to the shell of the boiler, giving an outlet of some 100 square inches. This, of course, afforded an aperture of escape for the pressure inside the boiler; the consequence was, that the boiler was forced in a contrary direction from the escaping steam with a force due to its velocity, which was maintained by the escaping steam on the rocket principle. The rupture took place at the point where the flange was turned on the lower side, hinging on the plate at its junction with the flues.

The escaping steam and water (if there was water) on the lower side of the head would react on the boiler, sending it in an opposite direction and upward, in proportion as the escaping of steam was below the horizontal axis of the boiler. This, of course, gave the rear end of the boiler an elevation in its flight, which was 200 feet, an entire block. It struck a wooden building at the junction of the first and second story, some six or eight feet above the level of its original position. In striking the building, which was a frail affair, the back end of the boiler struck the end of one of the main timbers of the floor, which was spruce, 6 by 4 inches, directly on the end. The point where the boiler impinged on the timber was on the angle of the head, about midway of its perpendicular diameter on the right hand side. On this pivot it swung around to the left, carrying away the side of the house, a partition, and flight of stairs, and fell on the floor, with the ends reversed.

This was, undoubtedly, a giving away of the iron from an over pressure beyond its strength to sustain it under the circumstances. And the circumstances, I think, are a key to the whole mystery, if mystery there be.

The iron where it was ruptured at the front end was, judging from the color, nearly red hot, even at the bottom, showing conclusively that at the time of the rupture there could have been no water in contact with it. At the other end of the boiler, where it struck the timber, it was ruptured, and crippled in a manner to show conclusively that it could not have been done, with the temperature due to any pressure safe to put on the boiler. Then, as the boiler fell, a large hole was made through the shell, and through one of the flues. These ruptures also show, by the color, that the iron was hot.

From the appearance of the boiler and its extraordinary flight, I arrive at the following conclusion: That when the fire was made under the boiler there was but little water in it, sufficient however to make steam of a tension to be nearly all the boiler could stand.

Now, then, we will suppose a pressure on the boiler almost equal to its bursting point; to produce this the water is exhausted, the plates are bare, become heated, and consequently weakened to a degree insufficient to sustain the pressure, and gave way in the weakest point. This being at the lower side of the front end, gave it the direction horizontal and upward. There were no indications of water having been ejected from the aperture, either on its start or during its flight.

It is said that a man was sitting over the front end of the boiler, which went out from under him and left him standing on the grate underneath covered with glowing coals! There is a record of a similar case which occurred in 1861.

The engine is of the common horizontal type; I should say, without measurement, 7 inches in diameter by 12-inch stroke, speed not known. It is capable, if in order and properly speeded, of working 8-horse power. The boiler was, if properly set, capable of working, economically, 15-horse power easily; but from the size of the furnace—12 square feet of grate surface—it could have given off 24-horse power. Now, with this immense preponderance of boiler to the engine, without a steam gage, with a safety valve that none knew any thing about—these elements in charge of no one that was an engineer, alternately in charge of the proprietor, his wife, and his son, it was most fortunate that there was a clear open space through the block from the point where the boiler started on its flight, until it crossed the street and met the building above described.

Three lives are already sacrificed, another is trembling in the balance between life and death; if he lives he will be a cripple; another, whose feet rested on the bed of fire after the boiler left him, must, of necessity, be crippled. And all of this because the owner wished to confirm the idea "Every man his own engineer."

MANUFACTURES IN HOLYOKE, MASS.

In our last issue (No. 5, present volume), we copied from the Hartford *Times*—usually a very reliable authority—some facts relative to the capacity of the Connecticut River at Holyoke, and statements in regard to the manufactures already established. We were led into some errors which have been kindly rectified by C. H. Lyman, editor of the Holyoke *Transcript*. Mr. Lyman gives the following as the leading manufacturing enterprises of that thriving village: Population, over 10,000; paper mills, Holyoke Paper Co., Parsons Co., Whiting, Franklin, Riverside, Mount Tom, Beemis, Hampden, Valley, and Hot Manilla; ten. Thread, Cotton, and Woolen Mills—Hadley Thread Co., including the Holyoke Thread Co.; Merrick Thread Co.; Lyman Mills (2 mills, cotton); Hampden Co. (2 mills, gingham and woolen); Beebe's Mill (woolen); Germania (woolen); New York (woolen); and Holyoke Warp Mill. Among other manufactures are the Holyoke Water Power Co.; Holyoke Machine Co.; Norton & Co., Machinists; Wire Mill; Belt Manufactory; Loom Harness; Steam, Saw, and Grist Mills; Job Printing, etc., and a well conducted weekly paper, if a newspaper can be called a manufacture. The village is evidently growing out of leading strings, and with its natural and artificial advantages it cannot be long before it will be enabled to aspire to the dignity of municipal honors.

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COTTAGES FOR LABORING CLASSES.

We herewith reproduce from *Sloan's Architectural Review and Builders' Journal*, published by Claxton, Remsen & Haffelfinger, 819 and 821 Market St. Phila., elevations, plans, and descriptions of designs of cottages for workingmen.

It is the first duty of society, for its own sake, to entertain every practical proposition for the amelioration of that great section of the community whose necessity it is to live in large cities. It will be found always, that the want of an orderly and comfortable house is among the chief evils of the poor.

On the outskirts of our cities are always to be found cheap lands suitable for cottages, such as we would desire to see our suburbs embellished with. Those lands might be secured, in the whole tract, by coöperative joint-stock companies, of which we are glad to see there are many now in active existenec in New York, and we hope to see them in every one of our large cities. Such blocks of land could be conveniently and elegantly laid out in lots having, uniformly, gardens in front all of one depth. This plan has been carried out in many of the avenues in Detroit, and adds breadth and beauty to their appearance.

Efficient drainage, dryness, and general healthiness should be the chief objects in the selection of a site for the erection of a cottage; and where a number are to be built, on an entirely new site, they should be so placed as not to interfere with, or injure the effect of the surrounding scenery.

The cottage should be so placed that the sun may shine on the most frequented sides of the house, or, if possible, let all the windows have a certain proportion of sunshine through the day. The design and its features should be so arranged as to have that effect. And every cottage should have a garden attached to it, of not less than about one-sixth of an acre, to be cultivated by the cottager. It should be neatly fenced, on the front especially, so as to add as much as possible to the landscape effect; and if a hedge-row be introduced, so much the better.

The division of lots should be marked by an evergreen hedge; and, until such hedges can be grown, a neat wiro fence might be used to advantage.

The first thing to be done, in laying out the foundations, is to see to the *drainage;* and this is a point of the utmost importance, as upon it mainly depend the health and comfort of its inmates. And not only is it requisite that the drainage be perfect, but it must be as little liable as possible to get out of order; and when disturbed for the purpose of cleaning, should be capable of reinstatement with the materials at first used.

Although a complete system of drainage would seem to have but little to do with cottage building, the general use of a tank for the common cesspool is most desirable—and the more especially, as in cases where a number of cottages are erected, one tank might serve the purpose of the whole.

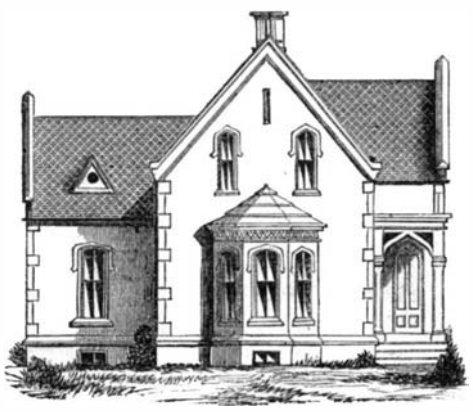
The most essential points to be attended to, in the drainage of buildings generally, are the following: All *main sewers* should be formed with concave bottoms, to allow the water, however small in quantity, passing along with solid matter, to act with the utmost possible effect; and they should be evenly built. They should have arched tops, although flags, well laid, make a good cover. Sewers should have a *fall* of not less than one inch in every ten feet in length, and more than this, in all cases, where the flow of water is variable. They should have a constant flow of water through them, or powerful flushes at stated intervals; and particular care taken to ventilate them.

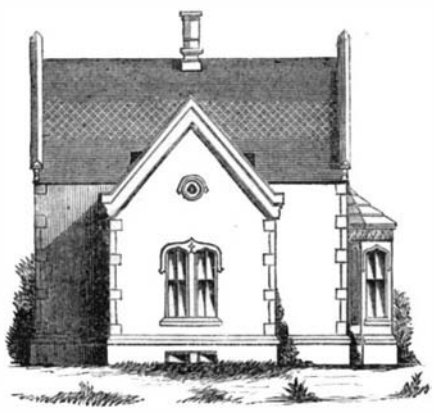
To prevent the foul air generated in, or returning by the drains, the waste-ways should be double-trapped, by a bell-trap at the sink, where the waste water enters; and by a well-trap short of the inlet to the drain.

All drains should be so constructed, as to admit of being opened for the purpose of cleansing, without breaking them, and of the displaced portion being afterwards replaced.

Each cottage should be provided with the means of collecting and filtering the rain water from the roof; and thus be independent of any other supply, the more especially, as rain water is the purest of all water.

The walls of cottages may be formed of a great variety of materials, and the nature of the material used is a fertile source of variety and beauty.





ELEVATIONS OF COTTAGES FOR MECHANICS.

Wood is the most susceptible of architectural ornamentation at the least expense. Some persons object to it, as requiring frequent painting, being combustible and perishable.

Stone or brick foundations are always to be recommended, even where cellars are not to be used; and by keeping the wooden frame well up from the ground, the objection as to perishability may be greatly lessened.

The walls are either *clap-boarded or vertical-boarded.* A very tasty effect may be produced by clap-boarding, say two feet six inches high, and shingling the remainder, up to the eaves; the shingles to have the corners cut off, to any desired shape; or slate can be very advantageously substituted, and so arranged, as to produce a very pleasing effect, and at about the same cost.

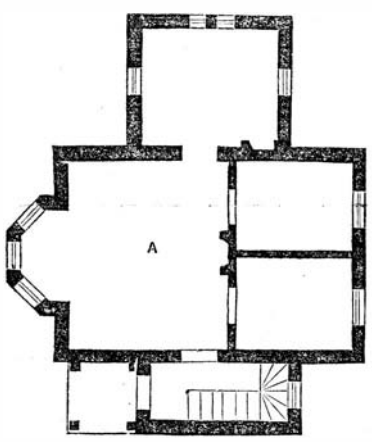
The accompanying designs may be constructed in either stone or brick. The walls, if of stone, should be fourteen inches thick; and, if of brick, eight inches.

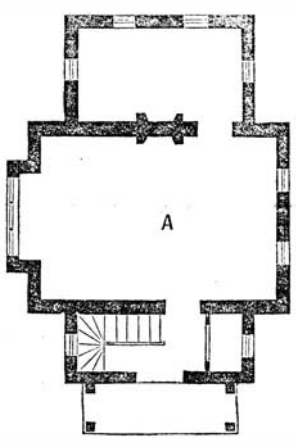
The plan is arranged thus: The living-room, marked A has two bedrooms at its rear, kitchen on the left, and hall entrance on the right. The second, or half story, gives bedrooms over each of these.

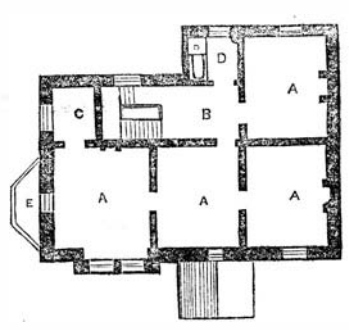
The other plan makes the living-room, A, the whole size omitting the two bedrooms. The house is smaller than the preceding one.

The illustrations following those are of a superior class of dwelling, suitable for a merchant, shopkeeper, artisan, or clerk. A is the parlor, with its bay-window, J; B, the dining-room; C, the kitchen with its shelved pantry, H; D, the hall; E, the vestibule; F, staircase; G, chamber; I, porch.

The second story: A A A A, bedrooms; B, hall; C, dressing-room; D, bath-room and water-closet; E, roof of bay-window.







GROUND PLAN OF UPPER COTTAGE. PLAN OF MIDDLE COTTAGE. PLANS OF LOWER COTTAGE.

Social Clubs for Mechanics.

A writer in the *Atlantic Monthly* gives a description of one of the workingmen's clubs which have in the last few years been established in many of the large towns of England. These clubs are not political, but simply of a social character. In fact, they are places where the workingman may pass an evening in a comfortable, well-lighted, well-warmed room, smoke his pipe, obtain certain refreshments, read the daily journals and periodicals, avail himself of a small library of amusing and useful books, amuse himself with all sorts of innocent games, and have free intercourse with his friends and acquaintances, without subjecting himself to the evil influences inseparable from the public-house. On Saturday the clubs hold what is termed a free-and-easy; that is to say, all reading and games are put aside, everyone draws around the fire with his pipe, and each one in his turn has to sing a song, tell a story, or otherwise contribute to the general amusement. Once a month the club gives an entertainment to the wives and daughters of its members, either in the shape of popular lectures, readings from "Pickwick," and other amusing works, dissolving views, conjurers, or music; and once a year the members of the club have a grand supper.

The writer asserts that these clubs have been productive of great good, and in no case have failed of success. The *Sun* says: "We take an especial interest in anything that contributes to the well-being and happiness of workingmen, and should certainly like to see the experiment of a club of a similar description tried in this city. Some people will no doubt say that such an institution is apt to drawn men away from their homes. To these we would reply, that there are occasions when it is just as well that a workingman should be away from home, and that it is more conducive to his happiness and respectability that he should pass his evenings in some such places as these, where he can have innocent amusement or improving occupation, rather than that he should spend his time in some smoky liquor shop. Moreover, there is a large portion of our working population which consists of young unmarried men. To these such a place of resort would be exceedingly beneficial. At all events, the experiment might be tried. We have every reason to suppose that our workingmen are as capable of appreciating the benefits of such an institution as their compeers across the water; and if the experiment should fail of success, its promoters would, nevertheless, have the satisfaction of feeling that they had failed in a good cause. An expenditure of $2,000 would start such a club as this on a firm basis, and the monthly payments of the members would be ample to keep it going."

Prof. Liebig states that 1,460 quarts of the best Bavarian beer contain exactly the nourishment of a two and a half pound loaf of bread. This beer is similar to the famous English Allsop's, and our more popular American beer.

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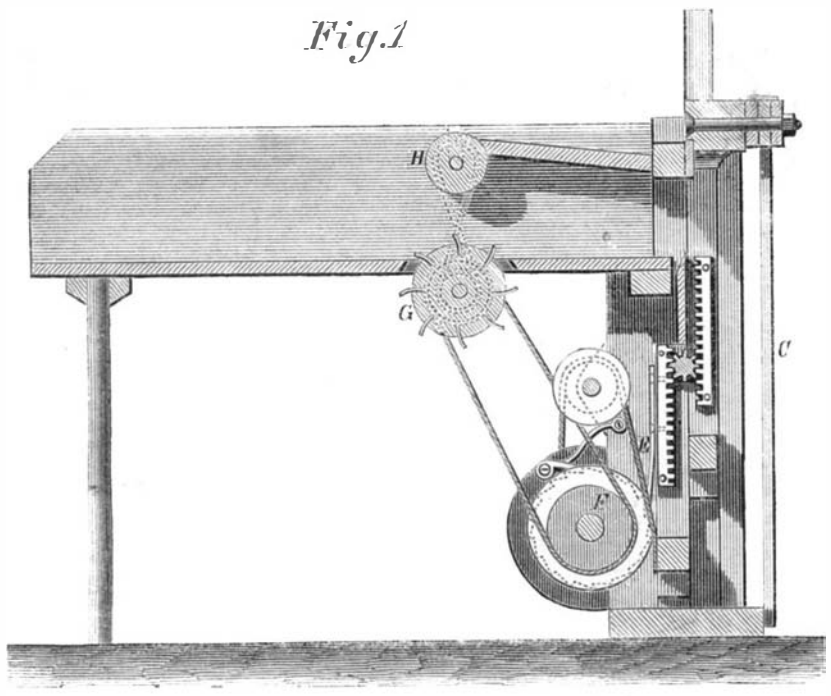
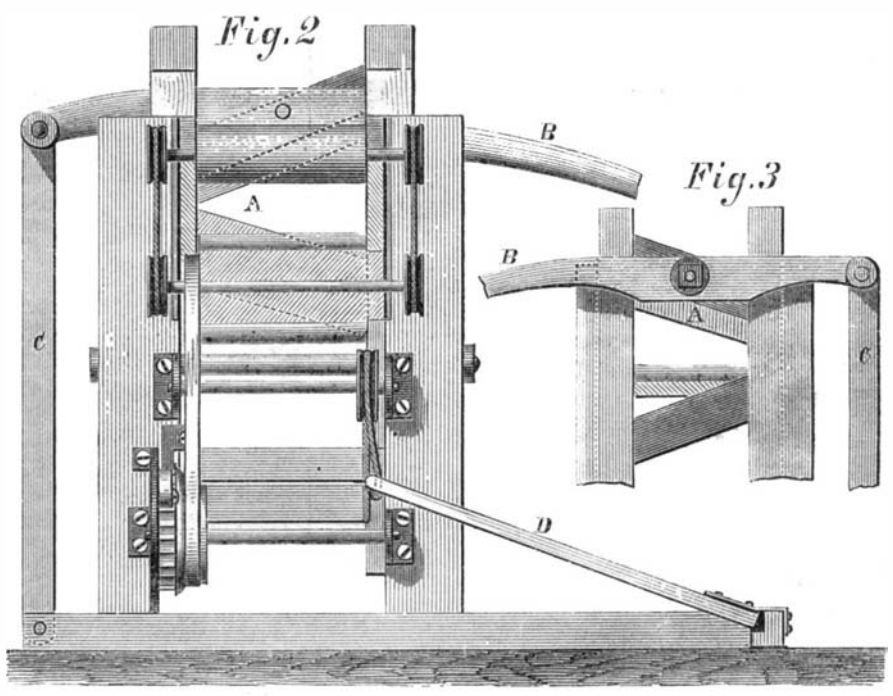
Improvement in Straw Cutting Machines.

The accompanying engravings represent in section the parts of a new style of machine designed for cutting straw and hay for the feeding of stock. Instead of rotary knives the edges of which meet each other and thus sever the straw, or one rotating cutter bearing on a yielding roller, or even a reciprocating knife passing by a fixed knife, this machine has two reciprocating cutters, each moving in opposite directions simultaneously, and so set as to cut like shears and with a drawing motion. The feeding of the material is also automatic, thus obviating the danger of severed or lacerated fingers. The machine is quite simple in construction, and, as seen from the foregoing statement, easy and exact in operation.

Fig. 1 is a vertical longitudinal section; Fig. 2, a transverse vertical section; and Fig. 3, a view of the knife and hand lever. The two front uprights are double grooved to receive the





AMBRUN'S PATENT DOUBLE ACTING STRAW CUTTER.

frames that carry the knives. These are fixed rigidly, at opposite angles, in their frames. Each of these frames has on its inner surface a toothed rack, as seen in Fig. 1, the teeth of which mesh with those of a pinion, thus insuring simultaneous reciprocating motion to the knives, seen plainly in Figs. 2 and 3 at A. The hand lever, B, is pivoted to the upper knife, its end connecting with the top of an upright oscillating bar, C, pivoted to the base of the frame. A treadle, D, pivoted at the end of the base has a cord, or band, attached to its free end that passes over a truck or pulley, and having its other end secured to the lower or rising frame. In cutting, the operator uses the hand lever and also this treadle, thereby giving great impetus, or force, to the ascending, as well as the descending knife.

The ascending knife has attached to its framing a spring, E, Fig. 1, that on its descent engages with the teeth of a ratchet, having fixed on the same shaft a pulley, F, from which a band, or belt, connects with the feed roller, G, which is either toothed or corrugated. From this feed roller, or from a pulley on its shaft, an elastic band passes to a similar pulley on a roller, H, suspended on the end of a pivoted lever.

This roller is intended to compress the straw to be cut on the surface of the feed roller. This is operated automatically by the spring strap, E, the ratchet, F, and its pawl. These appliances constitute the feed of the machine.

Invented by Julius Ambrun, Leavenworth City, Kansas, and patented through the Scientific American Patent Agency, Nov. 3, 1868. To the inventor all communications for further information should be addressed, as above.

Correspondence.

The Editors are not responsible for the Opinions expressed by their Correspondents.

Lightning Rods.

MESSRS. EDITORS:—I notice an article in your paper (No. 3 current volume,) headed, "Are Pointed Lightning Rods any Protection?" Allow me to ask the question. Is a lightning rod, as commonly erected, any protection at all? I wrote an elaborate article on this question, founded upon experience and observation, ten or twelve years ago, for the New York *Tribune*, showing that they were not only of no use but really a dangerous contrivance, often bringing the thunderbolt (electrical explosion) upon the building, when it would have gone some other place, had not the rod attracted it to the building. I had a personal conversation with Prof. Henry soon afterwards on this subject, and he expressed the same opinion you quote, to wit: "The office of a lightning rod is to protect a building from a discharge from the heavens. As a general thing its effect upon a distant cloud must be too small to silently discharge its redundant electricity, though in some rare instances it is possible that it may so reduce the intensity of the cloud as to prevent a discharge, when, without such reduction, a discharge would take place."

That was the ground I had taken in my article, and upon that showed that the lightning rod did not fulfill its intended duty when it received electrical explosions, but in such cases frequently caused the shattering of buildings and setting barns on fire. In a five years' record I kept of lightning strokes in Lancaster county, over two-thirds of the cases had lightning rods mounted, and six barns out of ten were burned to the ground with lightning rods mounted; that is, ten barns burned up, six of which were provided with rods and four had none. About that time a large number of buildings in New York and Boston suffered from electrical explosions, although surmounted by rods, and it was these stubborn facts that induced me to give to a widely published paper the science and facts in the case. The only counter article on the subject that I learned of was from Mr. Quimby, who simply stated that the cases I made reference to "were not surmounted with rods of his construction!" Now for the facts of the science. The discharge generally comes from the cloud to the earth. When it passes within tractive distance of a tractor, which may be a lightning rod or other metallic prominence, or any projecting pointed wood or stone, it will fly to that, at an angle to its previous course. When in such case it strikes the lightning rod it is like trying to knock the discharged cannon ball away from your person with the bayonet of your musket instead of drawing the charge from the cannon with the screw-rammer, or plugging up the prime-hole with a rat-tail file.

The legitimate office of the lightning rod is to draw the electrical surcharge from the cloud *silently*. That is the only scientific efficiency of the lightning rod, and the question is, how far from its point will the rod disarm this pending surcharge of the electrical cloud? Clouds rarely come within fifty or one hundred feet of the tops of houses and barns, oftener over one thousand to fifteen hundred feet. Will any electrician or lightning-rod maker claim for his rod the power of disarming a cloud one thousand feet above it. Prof. Henry said it *may* disarm it by induction. I will not dispute this theory as applied within reasonable distance, say within fifty feet of the point of the rod. Mr. A. George, of Philadelphia, a philosophical instrument maker, and myself saw a lightning rod illuminated at its point for several seconds at a time, one night when a thunder storm was passing over the city, but it was a remarkable condition of the atmosphere—hot and sultry, and the clouds appeared to be brushing the chimney tops. That rod was performing its legitimate office. Prof. Henry mentioned to me a similar instance he witnessed on the rod of the Smithsonian Institution, nevertheless that building has been twice struck by electrical explosions, and the rods on it are put up in the most approved scientific order. With the point of a penknife, or a cambric needle, you can draw the charge from the prime conductor of an electrical machine silently at a distance of ten or fifteen inches, but not that many feet, hence there is a very limited distance allotted to the withdrawing power of a lightning rod in drawing off a surcharge of electricity silently.

Tall trees near a building are better protectors to it than a rod surmounting the building. The top points of the tree, when elevated above the top of the building, will draw a "bolt" to the tree, though that bolt is moving toward the roof of the building. I examined one case where the bolt dashed into the top of a button wood tree standing in front of a one-story house: the house had a shingle roof, with a sheet of tin about four feet from the eaves, stuck in to replace a rotten shingle. The electricity run down a main branch of the tree to its crotch, and tore off the bark there, and thence jumped over about fifteen feet and right on the sheet of tin above-mentioned, made a hole in the tin as if a chestnut burr had been fired through, turning down eight points of tin into spiral coils or burrs around the hole, and from there jumped four or five feet down to the tin water conductor, perforating that a dozen or more places about the size of No. 6 shot—running right and left on the water conductor, and at the closed end jumped to the cornice of the house, tearing off splinters and expending itself on the corner bricks; while at the other end it ran down the spout, jumping from its end eighteen inches on to an iron water pan, displacing that and burrowing into the earth under the pan to a depth of a foot. There was no lightning rod on, nor within two hundred feet of the building. I examined a number of cases where tall trees drew the explosions away from the tops of buildings, as the directions of the bolts and the impact upon the trees plainly indicated.

After a five years' investigation of the subject, I took the lightning rods down from two houses I owned, looking upon them as decoy ducks to the errant thunderbolts that might chance to happen in that direction.

A lightning rod, or protector from lightning, either from a pending surcharged cloud, or a bolt, to be efficient, should be elevated on a mast or pole as high as possible—better 150 feet high than 75 feet—and it ought to stand a little distance from the building or buildings, surmounted with a metallic ball and finely-pointed gold or platinum point; it will then silently draw off the surcharge from a proximate cloud, and will also draw a stray bolt to the ball and rod, that may be moving in the direction of the building. By bolt or thunderbolt the intelligent reader will understand me to mean electrical explosions, in distinction from surcharges or surcharged cloud. A bolt is exploded electricity; that is to say, the cannon ball shot out of Jupiter's gun: surcharges or surcharged cloud is the cannon ball lying quietly within the cavity of Jupiter's cannon, but ready to go off at any moment that the match of electrical traction comes within its reach.

As regards the interruption of conduction by paints or other substances on the surface of a rod, I would say that I have often discharged an electrical battery with a pair of fire-tongs in my bare hand, and never felt the least effect upon my hand. A rough piece of iron would, no doubt, let some pass off laterally—the fire-tongs being smooth conducted it all.

Such are the stubborn facts, and science of the facts of electrical forces, as exhibited in thunderbolts and lightning rods, and if I have stated any controvertible points, they thould be pointed out for the benefit of mankind by some one better acquainted with the subject than your correspondent.

Lancaster, Pa. JOHN WISE.

Influence of Sunflowers upon Miasms.

MESSRS. EDITORS:—Concerning the influence of sunflowers upon miasms, treated in the leading article of your issue of Jan. 9, I beg to call your attention to page 154 of "Man and Nature," by Hon. George P. Marsh.

Mr. Marsh, supported by Lieut. Maury and certain Italian philosophers (whose writings have probably been read by the Belgian farmer of whom you make mention), asserts that sunflowers as well as forests are a protection against malaria.

As to swamp vegetation you take issue as follows:

"But it is specially noted that in low, swampy lands, covered with dense rank vegetation, they [miasms] are more numerous than in localities of opposite character."—*Scientific American.*

"It is at all events well known that the great swamps of Virginia and the Carolinas, in climates nearly similar to that of Italy, are healthy even to the white man, so long as the forests in and around them remain, but become very insalubrious when the woods are felled."—*Marsh.*

These are high authorities, Messrs. Editors.

Butler, Pa. E. LYON.

[With all due deference to authority upon this subject, we submit that we are not disputing facts, but a theory. The theory which we felt called upon to dispute in the article referred to by our correspondent, and for which we yet see no foundation, is, that the sunflower possesses a peculiar absorptive power, which, so to speak, soaks up malaria, or, more properly speaking, purges the atmosphere from miasms. We cannot admit this of the sunflower or any other plant from any light yet shed upon the subject. If the theory has foundation, the microscope ought to detect the germs which give rise to malarial fevers, etc., in the structure and circulation of the plants themselves, as it detects them in the human circulation. Nay, it should not only show their presence but should show that they accumulate there and do not again pass out to breed pestilence.

We are well aware that the presence of forests may act either to retard the production of malaria or to check its progress. One of the conditions required for its development is heat, which is greatly tempered by the shade of large forests over moist vegetation, the rapid decay of which is thus retarded. It is well known, also, that many malarial poisons do not rise but a few feet above the surface of the earth. This fact is so well recognized that it is a common practice with Europeans in India to avoid sleeping upon the ground floors of houses. Sleeping upon top floors to avoid malarial influ-

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ences is also practiced in other places, and the practice is based upon sound principles. It is easy to see, then, how the interposition of a dense forest between any locality and the source of malaria, would interfere with its progress. Currents of air would be almost as effectually checked by such a forest as they would be by a stone wall of equal hight. The progress of the poisonous stratum of air through such a barrier would be at least extremely slow. We see nothing in these facts to modify our opinions as expressed in the article referred to; but if any of our correspondents have facts at command bearing upon the subject, we shall be happy to hear from them.—Eds.

The Zodiacal Light.

Messrs. Editors:—On page 21, current volume of the Scientific American, it is asserted by a correspondent (Mr. J. Hepburn) that the zodiacal light is only on one side of the sun, and that the popular astronomical belief, that it constitutes a belt around the sun, is erroneous. He thinks to prove this by the fact that it is only seen at sundown at certain seasons, and at sunrise at other seasons; and further says that "if it could be seen evening and morning of the same day, then our astronomical friends would have somewhat to base their opinion upon."

In scientific, as well as in law matters, it is dangerous to draw conclusions from insufficient evidence. Mr. H. draws his conclusions from the very incomplete information obtained from our common astronomical school books; therefore allow me, for his information and that of your many readers, to state, that between the tropics, principally in the highlands of South America, it is seen not only morning and evening of the same day, but it is there a perpetual phenomenon the whole year round. Almost every night it illuminates the western, and almost every morning the eastern, sky, after sunset and before sunrise. Alexander von Humboldt gives in his "Cosmos" (German edition, vol. i., pp. 142–9, and vol. iii., pp. 537–91) a glowing description of the beauty of this zodiacal light during the tropical evenings and mornings in those regions, where he for several years observed it. He states that often it by far surpasses in splendor the milky-way. That in our northern so-called temperate zone it is only seen in March after sunset and in September before sunrise, is simply because the position of the zodiac is more perpendicular to the horizon in the west during our spring evenings, and in the east during our fall mornings—as at both these periods the sign of the summer solstice stands south of us, and therefore only about 17 degrees from our zenith. In March at sunrise, and in September at sunset, we have the sign of the winter solstice south of us, and as this is about 47 degrees lower than that of the summer solstice, it is 64 degrees from our zenith, and only 26 degrees from the horizon—a considerable difference in the position of the zodaic and the light belonging to it, which, for the reason of not being strong enough to penetrate our damp atmosphere so obliquely, only shows itself when the circumstances are most favorable; that is, when its direction is most toward the zenith. For the same reason the zodiacal light is in the southern hemisphere better visible before sunrise in March, and after sunset in September—just the opposite of the case here, simply because when the zodiac stands low for us it is high for them, and *viceversa*. All these facts are utterly incompatible with the hypothesis of a sun's tail.

The first descriptions of this phenomenon were published about 1650, and Cassini gave, in 1683, the first explanation that it consisted of a ring of luminous nebular matter, very flattened, and lying between the orbits of Venus and Mars. La Place, Shubert, Poisson, Olmsted, Olbers, Herschel, Arago, and Biot—all have observed this interesting phenomenon for years, as well as Humboldt, and after careful study, assisted by the apparatus of the best astronomical observatories, they all agree with Cassini. So it is seen that "our astronomical friends have somewhat to base their opinion upon."

P. H. Vander Weyde, M. D.

New York city.

The Polar Sea.

Messrs. Editors:—Is there an open Polar Sea? Perhaps the best answer to this question is, to show cause why such sea should exist. Let us see what would take place if this earth were totally covered with water. The sun sending his rays directly upon the equator, would heat a belt of water to 70° or 80°, and render it lighter, bulk for bulk, than cold water, and raise it above the common level. This would naturally cause the water to flow from all points of the equator toward the pole. In its passage toward the pole it would part with its heat—equalizing temperature, and flow on the surface of the ocean till its temperature would be reduced to about 40°, when, by its greater specific gravity, it would sink below the colder water and ice in the direction of the pole, and be, in a measure, protected from the cold in its passage to the pole. These warm waters approaching the pole from all points would meet, and be thrown to the surface near the pole, causing an open sea for some distance around. The waters now forced to the surface would return toward the equator on the surface, and give out their remaining warmth till they would reach the icy belt, to which they would impart a slight motion toward the equator. To keep up the current from the equator continually, there would be, of course, a counter current of cold water to take the place of, and supply the source of the warm current. This is the condition of our globe, excepting that not all of it is covered with water. This law holds good also in our atmosphere, and is the great equalizer of temperature over the globe.

Will not this theory also explain the causes of the gulf streams and the trade winds? The trade winds are always toward the equator, the same as the colder currents of water. There would be no gulf streams were there not large pent-up kettles of water near the equator, with contracted outlets through which the expanded waters are forced, with greatly accelerated speed; which is the only difference between a gulf stream and the general current setting toward the pole. The Caribbean Sea and the Gulf of Mexico are the caldrons supplying the Gulf Stream of the Atlantic, and the China Sea, that of the Pacific Ocean. All the phenomena apparently militating against this theory are the result merely of local causes, and, I think, we have reason to believe that there is an open Polar Sea. D. S.

Philadelphia, Pa.

The Hydrogen Gas Theory.

Messrs. Editors:—I note a communication from Prof. Wise, the renowned and daring æronaut, in No. 2, present volume of Scientific American, on steam boiler explosions. In a little work published by Daniel Burns, of Bay City, Mich., he says:

I shall show that those dreadful explosions occur from the passage of hydrogen gas through the boiler plate, when heated to an improper degree, and when that gas comes in contact with the fire it will explode the iron, for the iron becomes highly charged with gas. Not only is the gas contained in the iron exploded, but also that in the boiler. This class of explosions occur from low water, high steam, boilers being improperly set, and the rolling or careening of a boat. The other class occur from the latent heat set free from the steam in the boiler. As the position taken is entirely new, I will ask you to suspend your judgment until you have examined my conclusions, and then judge for yourselves.

A careful examination of the Burns theory, which may be had by addressing him as above, will furnish a satisfactory answer to all inquiries as to the cause and the prevention of steam boiler explosions. W. H. L.

Flint, Mich.

[With all due deference to the opinion of our correspondent we do *not* think the Burns theory satisfactory, if the above extract is a specimen. It seems to us that hydrogen gas alone—allowing it to be generated in steam boilers and to permeate the iron, which we much doubt—is not explosive. We have never succeeded in exploding a closed pipe containing it, and we have made several attempts. It is generally supposed that the presence of oxygen is necessary to produce even inflammability of hydrogen. We have treated this theory extensively in our columns already. The idea of igniting hydrogen in a boiler by the explosion of that which exudes through the pores of the iron, must presuppose the advent of oxygen through the same medium. If the hydrogen is forced out by the steam pressure how does the oxygen get in? Is it by atmospheric pressure? Is that at 15 pounds to the square inch more powerful than steam pressure at 70, 80, 90, or 100 pounds?—Eds.

Gas from Gasoline not Peculiarly Dangerous.

Messrs. Editors: In the second number of the Scientific American, page 28, current volume, you have an article headed "Dangers of the Use of the Lighter Products of Petroleum." You then go on and describe the cause of the late accident in East Cleveland, and say: "The gas pipes in the building had been leaking for some time, and the flame of the candle ignited the free gas in the basement, producing an explosion," etc., thereby showing that the material used had nothing to do with the explosion.

The whole article, headed as it is, leads a person very naturally to believe that the gas machine, which you describe in the first part of the article, was the cause of the explosion, and an opinion expressed by the Scientific American weighs very heavily in an argument on gas machines. We have been putting up and examining gas machines, used for making illuminating gas from gasoline, for the last four years, and have always claimed that the gas made from gasoline is no more dangerous than city gas. We have seen leaks in gas pipes, both in city and gasoline gas, and found that holding a light to the defective part would have the same results in either case, viz.: the gas flowing out of the broken pipe being ignited, and a flame corresponding in size to the break in the pipe becoming visible. These facts, we think, justify the opinion that the one gas is no more explosive than the other when allowed to fill an apartment.

Now, in justice to the gas machine men, of whom there are no doubt a great many among the readers of your valuable paper, we think, you ought to give us an article on gas machines, or gas from gasoline. When people talk to us about the dangers of gas machines, we call their attention to the fact that there are every night about a dozen glass coal-oil lamps carried about their houses in the hands of careless servants, which makes a dozen dangers to one when using the gas machine.

J. G. & Co.

Cincinnati, O.

[The frequency of explosions and fires, resulting from the difficulty of retaining the volatile and inflammable gas that is given off by gasoline, at even ordinary atmospheric temperatures, is sufficient reason for caution in the use and handling of this liquid We do not consider—and have never so stated—that the gas from gasoline is more dangerous than other gases of equal inflammability; it is the material from which it is made which should be carefully handled and defended from possible chance of ignition. If its use, as a basis for illuminating gas, can be made as safe as that of the materials now employed, it would be an undoubted public benefit.—Eds.

A Rule for Finding the Exact (?) Length of the Circumference of any Circle.

Messrs. Editors:—The rule and construction given under the above head, page 23, is, in fact, but a very rough approximation, giving a result only correct for two decimals, the third is wrong. Let us call the diameter, D, and express this rule in a formula, it is, circumference $=10\times(D\sqrt{2}-D)-11$; or, $10(\sqrt{2}-1)D-D$; and adopting the diameter as one, it becomes $10(\sqrt{2}-1)-1$; or, $10\sqrt{2}-11=3{\cdot}1421356$ etc.

As we know (see page 44, current volume) that the true circumference for the diameter 1, is 3·1415926 etc., the above rule gives the circumference too large; in fact, so much that it leads to the absurd conclusion that the circumference lies outside the circumscribed polygon of 192 sides, of which the periphery is 3·1418731, etc. This last number is correct beyond the shadow of a doubt, and that the circle itself must be smaller, is evident.

For the benefit of those who perhaps doubt the correctness of the number 3·1415926 etc. (and which is now used by all mathematicians in their calculations), it may be observed that the circumference of a circle must necessarily always lie between the periphery of the inscribed and circumscribed polygons; when these polygons have numerous sides, they lie very close to the circle and include it in very narrow limits; elementary geometry may teach how to calculate the periphery of these polygons, that of 12,288 sides is found to be 3·1415926, etc., when inscribed, and 3·1415927 etc., when circumscribed, so the circumference of the circle must be larger than the first and smaller than the second of these numbers.

I have in a treatise on the quadrature, published in 1861 by Appleton & Co., New York, demonstrated that no geometrical construction or algebraic expression, short of an infinite series, can possibly express the correct relation between diameter and circumference, only simply irrational expressions as the above cannot give but an approximation. One of the simplest I have found is this: multiply the given diameter by $0{\cdot}26\times\sqrt{146}$. This expression is easily transformed in a geometrical construction for rule and compass, and reduced to a decimal fraction, it gives 3·1415919 etc.—correct to within the fifth decimal, and differing from the true circumference only the half millionth part of the diameter.

New York city. P. H. Vander Weyde, M. D.

Digging and Dredging Machines Wanted in British Guiana.

Messrs. Editors:—Some years ago, when residing in Canada, I was a regular subscriber to your paper, and noticed at that time your willingness to afford information on mechanical subjects.

I write now to ask if you are aware of any instrument invented that will supersede manual labor in digging the soil in this colony. Sugar is the only production, and we have made, in 1868, 100,000 tuns; but this is done at a vast expense when compared with other places producing the same staple, and our increased expenditure is due to the fact, that in cultivating the soil we cannot use even a plow. This place is like Holland, below the level of the sea (at spring tides five feet), and the water is kept out by large dams or embankments. The country is perfectly level, not a hill ten feet high to be found in the cultivated districts, and the soil very rich, being the deposit of the river, and not a stone to be found five hundred feet below the surface.

Our labor market is supplied from India and China, the free blacks, some 70,000 in number, doing very little indeed, and many of the estates have from 500 to 1,000 acres in cultivation. The whole of this large surface is dug by the shovel. I send you plan, which will show you how it is that a plow cannot work. The black lines show the canals by which the canes are brought to the mill, while the red ones show the mode of drainage, which has to be very complete, the water being discharged by 30 to 60-horse power draining engines. The drains leading into the main draining trench are 20 feet apart, and two feet wide, while the sucker drains leading to them again are 10 feet apart, and 10 inches in width. You can therefore see how the land is cut up, and how it is that a plow cannot work. Thousands of pounds have been spent in trying to get the steam plow to operate by pumping the drains, but without effect; and the information I ask is, is there any labor-saving machine that would dig the earth and turn it between ten to twenty inches deep, and thus save the immense amount of labor we now use?

Do you know also of any machine that, acting something like a dredge, would dig the main canals, say from 12 to 16 feet wide and 4 to 6 feet deep, throwing the dirt on the side.

The firm, of which I am a partner, have twenty-five estates under their control, on which over 20,000 laborers are employed, and if either of the above machines are feasible and procurable, large orders might go forward for them.

Geo H. Oliver.

Georgetown, Demarara, British Guiana, Jan. 7, 1869.

[Any parties having machinery which will accomplish the ends sought by our correspondent, will do well to send a description of it to the writer, or communications may be sent to this office.—Eds.

A Regulator for Ordinary Augers.

Messes. Editors:—Can any of your inventive readers devise a means by which may be insured perfectly true boring with the longer shanked, beautiful American augers, when passing through wood, four, five, or six inches thick, where great accuracy is needed. Not only have I met with difficulties, but carpenters have frequently been foiled, and although I have often essayed to contrive a regulator I have not been successful, and I shall feel greaty obliged if any simple means can be suggested to assist me in the use of the auger and brace. My lathe will not assist me, being too small. I find there is generally a disposition when working the brace to incline somewhat to the right, and if some indicator could be contrived by which the slightest variation from a direct line could be indicated, or, better still, prevented, it would be a great benefit to others beside amateurs like myself. M. D.

The Villetta, Ensworth, Hants, England.

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THE PHOTOMETER---LECTURE BY DR. J. OGDEN DOREMUS.

Reported for the New York Tribune.

Prof. J. Ogden Doremus delivered the ninth lecture of the scientific course before the American Institute, January 22, at Steinway Hall. He said:

"In the beginning God created the heavens and the earth, and they were without form and void; and darkness was upon the face of the profound. "What pen shall describe, what tongue shall tell, what human imagination conceive of that tide of glory and splendor which undulated throughout immensity when God said, "Let light be" and light was! Such is the most beautiful and terse description offered in that Word of God which the Christian, as he leaves his anchorage on earth, blesses the Almighty that he can pillow his head upon. To tell the story of the first light which dawned upon the universe of God is beyond the power of man. To tell indeed what has been discovered concerning it would extend beyond the short time allotted to a lecture. That light moves through space with the immense velocity of nearly 200,000 miles in a second of time; that when we look at the sun we gaze at the light that parted from it minutes ago; that when we look at the stars, no one is so near us but that three and a quarter years have elapsed during the passage of that mysterious influence; and when we look up on such a beautiful cloudless night as this evening, and see the magnificent scenery of the heavens, that those worlds send us light which started on its march long before we were born, and, in many cases, ages before our race was existing upon this world—all this is known to modern science. After some further preliminary remarks, Prof. Doremus said that he should not attempt, in this lecture, to discuss these questions, but should come down to three simple points: 1. How do we produce light? 2. Of what is light constituted? 3. How do we measure it? We produce light, first, by the simple production of heat. He illustrated the production of light and heat by various beautiful experiments—burning the metal antimony in chlorine gas, phosphorus with iodine, and in the oxygen of the air; potassium on a piece of ice; zinc in oxygen, and melting and burning iron before the oxyhydrogen blowpipe. The lights thus produced were of different colors, and of great heat and brilliancy. But, said he, it is not enough to produce heat. If the product of the combustion is only gas—as he showed with the flame of a common Bunsen burner—intense heat, but very little light is produced. To change the heat to light, we must have a solid body to give out the light. By heating a bit of lime in common street gas, burned with a jet of oxygen, the brilliant calcium light is produced.

He showed the same light with small pieces of compressed magnesia, heated the same way. He also produced a similar brilliant light by burning the metal magnesium in the air. But, said the lecturer, we can produce light by certain means which far surpasses any of them. He then exhibited the electric light, produced by the aid of a battery of 350 jars, such as are used in our electric telegraphing. By using points of brass, copper, and iron, light of different colors, and degrees of intensity was produced, but with points of charcoal he produced electric light of most dazzling brilliancy, almost equal to the light of the sun. He also showed beautiful revolving lights of different colors, produced by sparks from the electric machine passing through partial vacuums of different gases. He stated several means of measuring light: by means of degrees of heat—its chemical action—or its illuminating power. He exhibited two kinds of photometers for measuring the illuminating power of light—one, that of Bunsen, the one commonly used—and the other a large screen, on which the shadows produced were successively obliterated by the light of a candle. The gas-burner, the Drummond light, the magnesium light, were successively obscured and obliterated, until the more brilliant electric light obliterated them all. The lecture was full of valuable instruction, and his experiments as brilliant and beautiful as his theme. But perhaps the most interesting of all was what he said of the new and cheap method of making oxygen gas by passing superheated steam over manganate of soda, and of the great improvement this will effect in lighting our streets, public buildings, and light-houses. He said that the improvement would effect a saving of 30 to 40 per cent, and would not render the air impure by burning up its oxygen or filling it with noxious gases, and by its harmonious blending of the different colors, would furnish a more beautiful and perfect light resembling that of the sun. It is already used in Paris and soon will be in New York, some of our heaviest capitalists having taken it in hand. With 18 burners lighted in this way, he illuminated the entire hall most brilliantly, the large number of common gas burners paling before it into a sickly yellow light. It was greeted by the delighted audience with the greatest enthusiasm.

NOTES ON THE VELOCIPEDE.

The Commissioners of Prospect Park, Brooklyn, have not only decided to admit velocipedes, but are, we understand, making preparations to afford special facilities for this delightful sport. In regard to schools of instruction in that city, the Brooklyn *Morning Union* of Jan. 20th, says: "The first school for instruction in the art of riding velodipedes had not opened its doors a month before it had to be enlarged, for though commencing with twenty-five pupils, it closed the first month's book with a list of two hundred and twenty-five. Of course another school had to be started, and Pearsall's Twenty-second Street Academy, up town, was followed by Monod's William Street School, down town, the former being crowded at early morning and in the evening, and the latter at spare half hours in the middle of the day. Last night, too, Parker opened a school on Broadway and Forty-ninth street, and the Hanlons open another on eleventh street and Broadway. What New York had Brooklyn must have; and as we found a man who could beat New York fearfully in gymnasiums, we looked to him to whip them in velocipede schools, and our energetic, enterprising townsman, Avon C. Burnham, 'has gone and done it' in his usual masterly style, and now we can crow over having the best velocipede school in the country." It is proposed to use the Clermont Avenue Rink as a great school, as soon as the frost breaks; and it is stated also that the Capitoline, a popular skating park, will also be utilized in this way. So much for Brooklyn, which nobody thought to be a fast place.

The velocipede fever is raging in Massachusetts. A flourishing school exists in Middleboro', and another one is to be opened in Plymouth, where a building recently occupied as a Methodist meeting house is to be fitted up as a rink.

The Cincinnati Velocipede Club have been giving a series of races of which the following is a brief account from the Cincinnati *Commercial*: "The first race was one of a mile in three heats, six runs around the hall being counted one third of a mile. The contestants were Mr. George W. Gosling and Mr. George C. Miller.

"Mr. Gosling lost the first heat by a fall. Mr. Miller made his first third of a mile in one minute and twenty seconds. Mr. Gosling maintained his equilibrium in his second heat and came home in 1 :16. Mr. Miller beat this time in his second heat, finishing his sixth round in 1 :15½. Mr. Gosling made his third heat in 1 :16½, and Mr. Miller accomplished his third heat in 1 :16, and was declared winner of the race, and the prize, a handsome silver goblet, worth $100, given by Mr. William Wilson McGrew.

"The second race was one of a third of a mile, the fastest rider to receive a silver wine-service, the contribution of Henry R. Smith & Co.

"Mr. Gosling was the first in the field. He made the third of a mile in 1 :29 2-5. Mr. Miller followed, and made the distance in 1 :16 3-5. Master Curtis, a vigorous little velocipedist, made a valorous struggle for the prize, but his brisk little pony was not equal to the task. He made the six rounds in 1 :35. Mr. McKinney followed, but lost by a fall. He gave way to Mr. H. L. Perry, who lost by touching the floor with his foot in the second round. At this juncture St. Clair, the skater, plunged in with an impetuous steed, which made directly for a post, and threw him to the floor, thus being the means of losing the race for Mr. St. Clair. Mr. Wm. H. Davis put his animal on the track, but unfortunately gave him so much rein that he broke badly in the third round and lost the race. This ended the race, and Mr. Miller was declared the winner.

"The third prize, a silver goblet, contributed by Duhme & Co., was the person who could ride the velocipede at the slowest gait. This slow riding on the velocipede is a delicate task, and good requires judgment and a deal of fine management on the part of the man who attempts it. Mr. Gosling prolonged his three circles around the hall to 3 :15 3-5, and the spectators thought him very slow. But Mr. Miller, his only rival, was much slower, and crept around the hall like a tortoise, finishing the feat in 5 :10. By this achievement he won the third prize, and the plaudits of the whole assembly. The sport wound up with an exhibition of the skill of all the velocipedists present. All the races were interesting, and those for the fastest time were very exciting indeed, rousing the spectators, and drawing from them cheer after cheer as the particular favorites gained advantages."

One of the Troy, N. Y., dailies having asked the question, "Who is the young man destined to be the first to introduce the velocipede in Troy?" has received the following answer from a correspondent:

"You ask in your Thursday's issue, 'Who is the young man destined to be the first to introduce the velocipede in Troy?' That young man has long since 'gone to that bourne from whence no traveler returns.' The velocipede is no new thing in Troy—it may be new to the present generation, but it long since rattled over the streets of our city at a rate of speed that would make the famous 'Dexter' sweat, or a second class locomotive puff and blow like a Third avenue clam horse. Forty-six years ago, or thereabouts, a then young man (and one of the best that ever lived in this city, too), by the name of Silas Davis, who resided on the south-west corner of Liberty and First streets, exactly opposite to where the holy temple of St John now stands, and who was an apprentice to one of the best machinists that ever lived in or carried on the business in Troy, by the name of John Rogers (father of our fellow-townsman Alexander Rogers), and whose business was then located on the south-west corner of Division and First streets, which shop is now a dwelling, and was lately occupied by Justice Neary; and he, in connection with said John Rogers, constructed three of these wonderful vehicles called velocipedes, and introduced them upon the streets of Troy, for the use and benefit of all who were disposed to pay the then considerable sum of twenty-five cents an hour for their use. The first one, if I remember correctly, was brought out for exhibition and trial on a magnificent moonlight night in the month of June. No public announcement heralded its coming. It appeared, nevertheless, in front of the hotel of the late William Pierce, located on River street between Congress and Ferry streets, between 8 and 9 o'clock in the evening, and although the mansions of our city in those days were as far apart, on the average, as village lamp posts, and our population could hardly be counted for the paucity of its numbers compared to what it can be now, a respectable crowd soon gathered, and a disposition to try the untamed and wonderfully curious steed was soon manifested by many of the young men who had there gathered. The first man to mount and give an exhibition of its operation was Davis himself. He handled it with perfect ease and drove it with tremendous velocity from Congress street to Washington street and back. All were astonished and delighted. The velocipede was declared to be one of the world's greatest wonders—bound to supersede horse flesh for traveling purposes. Livery men began to look blue and almost made up their minds that their occupation was in danger of simmering down to such small ends that they might as well abandon the business at once, and substitute, on dry and pleasant weather at least, velocipedes for saddle horses. The next person to mount the prodigy was Benjamin Bayeux. He was the fortunate possessor of a 'quarter,' and could use the thing for an hour. After one or two capsizes he got under full headway, and made excellent work of it, driving the machine at a 2:40 gait down River to Division, up Division to Third, up Third to River, up River to Mount Olympus, and back to the hotel, in an incredible short space of time, when he surrendered it to Moses V. Yevnett, who was equally successful in its operation, and the velocipede was pronounced a success. They were used after that about the embryo city for a year or two by the young bloods of the town, and then finally disappeared, to re-appear again at the expiration of almost a half century, to make a sensation and excite the greater admiration and astonishment of their beholders." This velocipede was probably one of the old style propelled by contact of the feet with the ground.

Captain Du Buisson, Commander of Prince Napoleon's yacht, the *Jerome Napoleon*, has an invention whereby he proposes to run a velocipede upon the water with almost the same facility that Burnham and Hanlon run theirs upon the land. It is composed of two parallel tubes of cast iron, cigar-shaped, connected by iron cross-pieces. In the center is a propelling wheel, covered by a house or drum, on the top of which the person using the vessel sits comfortably in a sort of saddle, with stirrups. By means of these stirrups and a hand crank upon each side, he gives the wheel its motion, precisely as it is given to a velocipede on shore. The novel craft is easily propelled at the rate of six miles an hour.

A correspondent of an English paper announces that he has invented, and will shortly exhibit, a one-wheeled velocipede, and says that it is safer and in every way superior to the two-wheeled machine. A steam velocipede has also been invented in England, an engraving of which, with description, will be shortly given to our readers.

A gentleman residing in Twenty-second street, in this city, comes down to his business in Church street, on a velocipede, every morning, in twelve minutes.

A lady residing in Brooklyn, writes to us that, for her part, she objects to the double side-saddle plan, suggested by our fair correspondent from Georgia, noticed last week. She sees no objection to ladies donning a proper dress and using the velocipede pure and simple. She argues that the exercise would be much more thorough and healthful, than it could be on any such mongrel machine as the one suggested by our Georgia correspondent, while one of the principal charms of velocipede sport, its delightful independence, would be entirely lost in such a machine. She is willing to grant that the company of an agreeable gentleman would go far to reconcile her to the disadvantages of such a machine, but if two ladies were to be paired thus she thinks it would be simply intolerable. One thing is certain, the ladies can not be left out in the consideration of this subject by manufacturers.

Speaking of manufacturers, we understand that establishments devoted to velocipede making, have their hands more than full to meet the present demand.

The "Kenosha" Steam Frigate.

We have received the following account of a splendid ship just finished at the Brooklyn yard, built under the supervision of B. F. Delano, constructor at this station: "The U. S. S. *Kenosha*, built at the navy yard, Brooklyn, N. Y., is of the same class as the *Alaska*, built at Boston, the *Algoma*, at Portsmouth, N. H., and the *Omaha*, building at Philadelphia. They are all from one design by John Lenthall, Chief of Bureau of Construction and Repair. The machinery was designed by B. F. Isherwood, Chief of Bureau, Steam Engineering.

"The first frame of this ship was raised on the 27th of June, 1867, and she was launched on the 8th of August, 1868. Her principal dimensions are: Length, extreme, 268 feet 9 inches; length on load line, 250 feet 6 inches; extreme breadth, 38 feet; depth of hold, 19 feet 7 inches; tunnage (new), 1119·68 tuns. She has two decks beside the poop and forecastle, with 6 feet head room in clear of beams. The ward room is arranged with ten comfortable state-rooms, five on each side, and a good sized "country" between. In the after end is a large ward room pantry and two store rooms. Forward of the ward room is the steerage, which contains three good state-rooms, beside a room for assistant engineers, 12 feet long, and the midshipmen's room, 18 feet long. The necessary store and mess rooms are forward of the steerage. Below decks are the magazines, shell rooms, store rooms, etc., forward and abaft the machinery. The rig of the vessel is barque. The armament is one 11-inch pivot, six 8-inch guns on iron carriages, one 60-pounder on forecastle deck, and two 24-pounders on poop, beside two 12-pounder boat howitzers.

Her engines are double piston rod, back acting, having two cylinders, 50 inches diameter by 42-inch stroke, Sewell's condenser; 4 main boilers, 5 furnaces in each, superheater in uptake; grate surface 390 square feet; total heating surface 7,260 square feet; two smoke pipes 64 feet above grates, 72 inches diameter; two bladed, hoisting screw, 16 feet 4 inches diameter.

The ship will soon be in commission, the work on her being nearly completed. The machinery was all built at the Brooklyn navy yard, except the screw shaft which was forged at the Washington yard.

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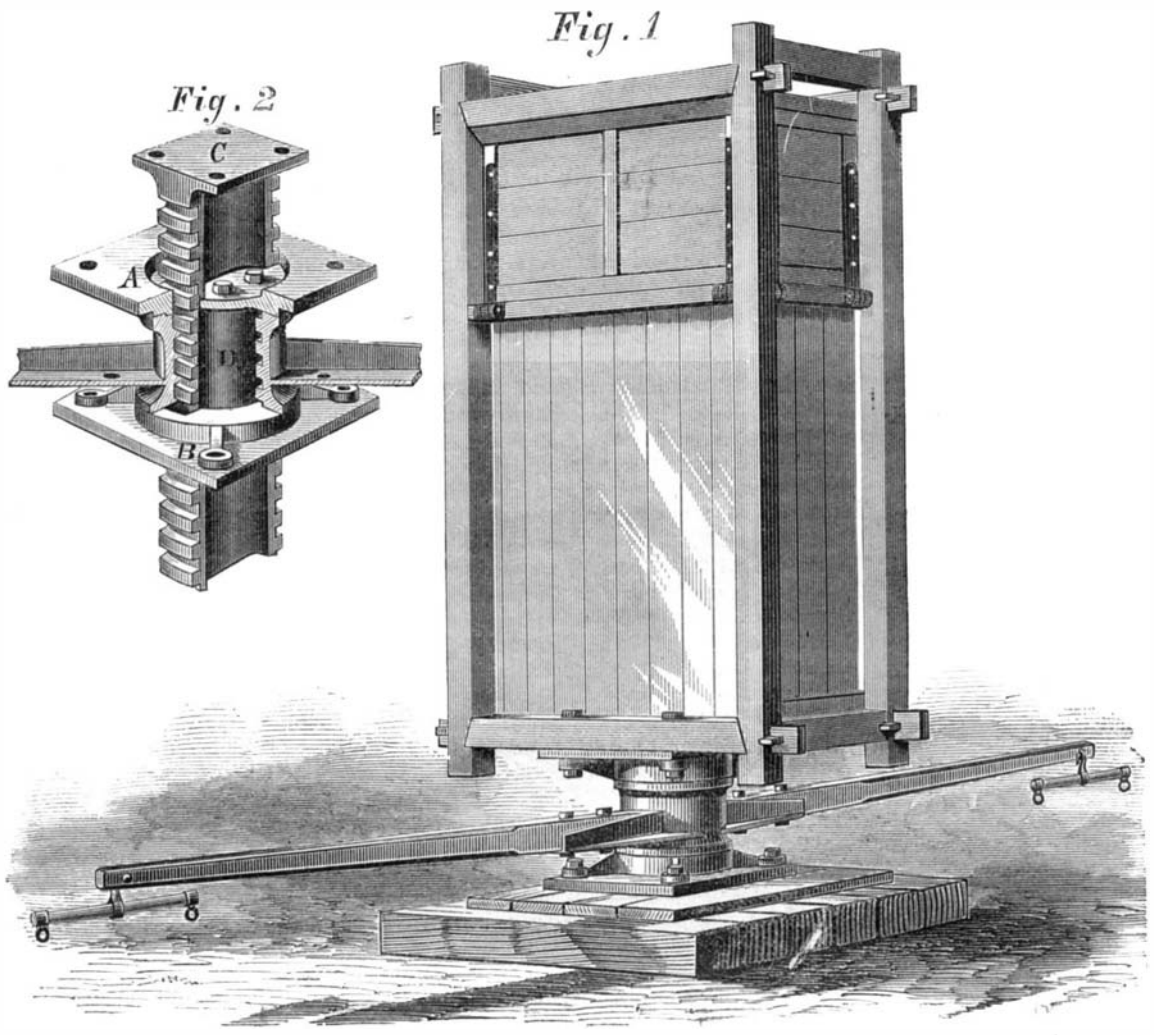
Improvement in Cotton and Hay Presses.

The simplest device for pressing and baling cotton is the screw, usually of wood, and is employed on three-fourths of the Southern plantations. It has generally a diameter of from sixteen to twenty inches, with a pitch of thread of from six to nine inches, and is operated by two long levers extending from the top of the screw at an angle until they nearly reach the ground, to the ends of which horses or mules are attached for working it. Various attempts have been made to supersede these presses, which are rude and cumbersome, work with great loss of power from friction, and, as they cannot be housed, wear out more from exposure to the weather than from actual use; and a great many presses have been invented, none of which has realized the anticipations of their inventors. They worked too slow, were too weak to give the enormous pressure required to bale cotton, could not be repaired, if broken, by means at hand on the plantation, or, perhaps, more than from any other reason, were too expensive. The wood screw has these advantages, which overcome in a measure its many disadvantages: It can be built entirely from material to be found on the plantation, requires but little iron work, works with great power, and is not complicated with levers, ropes, pulleys, and windlasses. Owing to its coarse pitch but few turns are required to run it up and down, a very important matter when it is considered that the horses move in a path from thirty to forty feet in diameter. Of late years the cast-iron screws have found favor, as the planter has only to purchase the iron work, and the wood work is done, as heretofore, on the plantation; and many forms of adapting these screws to their work have been devised, some of them having great merit.

The objections to the common cast-iron screws are these: They cannot be made of a diameter large enough to receive the coarse pitch of thread that is required to save the travel of the horse, and bale the cotton rapidly; and being of cast iron and small diameter are liable to be twisted off, as the screw presents the greatest length when the strain is the heaviest. The design of the screw here shown is to be obviate as far as possible the objections against both the wood and iron screws.



ALBERTSON'S PATENT SCREW PRESS FOR BULKY MATERIALS.

The receiver is a box, or pentstock, in the usual form, having at its upper part hinged sides or doors for removing the bale. A follower traverses the lower portion, being connected with the elevating screw. The whole is supported on a pedestal composed of two plates of any required size and form, one bolted to the receiver and the lower one to a suitable platform. They are represented in Fig. 2 by A for the upper plate and B for the lower. The follower is bolted to the end, C, of the screw. The screw is a double or triple segment of threads—in the engraving double—recessed below the depth of the thread on either side. Segments of a cylinder, D, forming portions of the plates, A and B, and hollow, admit bolts through to secure the two plates together. Between these plates turns a nut, outside the segments of the cylinder, which represent the size of the screw, the nut being furnished with sockets for the reception of levers to the outer ends of which the power—animal—is attached. It will be seen that the pedestal is the entire support of the superstructure, and the power being applied directly, near the ground, and the screw traversing through a fixed column, no unnecessary torsion or twisting of the fabric occurs.

The screw, however, may be secured to the top of the press, or, in other words, the press be inverted, if desired, although the friction and consequent power required will be greater. It will be seen that the screw cannot receive any twist, being firmly held by the pedestal at the point where the power of the nut is received by the screw, and the only strain that the screw receives is in the direction of its length. By relieving the screw from twist, the following important advantages are secured: The screw can be made very light in comparison to the weight that would be required for a cylinder receiving the twist, and any desired pitch, however coarse, can be used. There is no friction of the follower on the sides of the press box. The nut is supported by, and revolves entirely on the body of the pedestal. The iron work can be made and shipped to the plantation, and the wood work of the press made there as heretofore.

This press was patented December 15th, 1868, by James M. Albertson, of New London, Conn., to whom all letters for information regarding the manufacture and sale should be addressed.

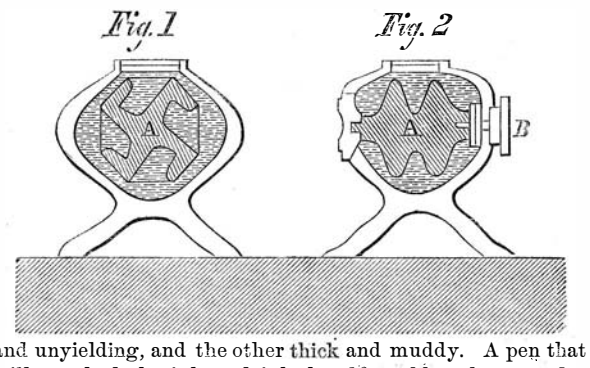
NEARLY two millions of false teeth are annually turned out of a single manufactory in Philadelphia.

The Philosophy of Tea-Making.

The results of the investigations of careful experimenters are hardly, perhaps, sufficiently known to the multitude of tea-drinkers. The whole subject is carefully summarized by Dr. Letheby in his recent lectures. There is a popular notion, which is an incorrect one, that soft water is best for tea-making. As a matter of fact, water which has about five degrees of hardness when boiled, makes the best flavored tea, provided that it be allowed to stand upon the tea sufficiently long. Boiling tea is one of the follies of which the officials in workhouses and other large establishments are guilty. This makes a deep-colored solution, containing the worthless bitter extractive matter, which is devoid of physiological or dietetic property. In point of strength, it is found experimentally that infusions of tea and coffee are strong enough when about two and a half teaspoonfuls of tea, or two ounces of freshly roasted coffee, are infused in boiling water.

THE STOLTZ ROTARY INKSTAND.

Years ago we suggested as a worthy object of scientific research and mechanical ingenuity the discovery and production of something to supersede the slow, dirty, annoying, and laborious device of pen and ink. The mere muscular effort of carrying the hand back and forth from paper to inkstand and *vice versa* is no small tax on the bodily powers, and no less a tax on time. So firmly are we rooted in this opinion that we prefer the use of the common lead pencil to pen and ink whenever its use is permissible. But, in addition to this annoyance, are those of oxidized pens and oxidized ink; the first rough and unyielding, and the other thick and muddy. A pen that will not shed the ink, and ink that blurs, blots, leaves a *bas relief* of dirt on the paper, or sticks to the pen like molasses are not calculated to soothe the ruffled feathers of the hurried or worried pen driver.



We copy from the London *Mechanic's Magazine* two views of a rotary inkstand, which, it is claimed, prevents the introduction of foreign bodies, allows the contents to be shaken without spilling, and permits the quantity presented for use to be varied according to demand, while at all times the ink is preserved from contact with the air and consequent oxidation. Fig. 1 is a cross section and Fig. 2 a vertical section of the inkstand. A disk, A, containng four cups, rotates in the body of the inkstand, being turned by a button, B, projecting on the outside. Turning the button to the right fills one of the cups and brings its top or mouth to the aperture in the stand. Turning it to the left empties the ink contained in the cups and leaves the solid part of the disk under the aperture, closing the orifice. Thus the ink need never stand long enough exposed to the air to become fouled with dust or to become oxidized. Packings of rubber are interposed between the axis of the rotating disk and the side of the stand to make a hermetical joint and secure sufficient friction to keep the disk in place. These are important advantages and if they can be secured by so simple a device as the one illustrated are certainly worthy attention. We have never yet used an inkstand that fulfilled all the requirements necessary to a proper enjoyment of the delights of writing or the demands of business. If this is not perfect we are certain that its suggestions will not be lost on our inventors.

Acarus Sacchari, The Sugar Insect.

The following is a synopsis of Robert Niccol's research as to the *acarus sacchari:* Every variety of unrefined sugar contains more or less acari, minute insects, resembling somewhat the sea crab. These are well known in sugar warerooms; and no one who sees them running nimbly along the tables would ever use raw sugar. Many believe it more economical, and sweetens better, and really a teaspoonful does go farther than the white article, but it is because it is heavier, but if an equal weight of the refined was used, it would be far better. It not only impairs the flavor of the tea and coffee, but also is injurious to the health; the dry, large-grained, and light-colored is the most nutritious and economical. In a pound of sugar there are no less than 100,000 of these insects. Dr. Hassel says that out of seventy-two samples, he observed sixty-nine in a living state. By dissolving a spoonful of raw sugar in a glass of water, these may be seen on the surface as white specks. In refined sugar they do not occur, because they cannot pass through the charcoal filters of the refinery, and because it does not contain any nitrogenous substance, as albumen, for even the most insignificent animal cannot exist if entirely deprived of nitrogen. When the refined article is left too long in iron cisterns, after its solution in water has been effected, a trace of the metal may become dissolved, in which the sugar is impure, this rarely however occurs. Grocers and sugar-warehouse men are subject to a kind of "itch," affecting their hands and wrists only, and as they are usually of cleanly habits, the disease can only be accounted for in this way, that the *acarus sacchari*, like its congener, the *acarus scabiei*, has burrowing propensities, bores into their skin, and breeds there. These two resemble each other closely, though the sugar insect is larger and more formidable. Pure sugar is almost as desirable as pure water, and who would, who has any pretension to cleanliness, drink stagnant water if he could as easily obtain it pure, and who would eat raw sugar, teeming with animalcules and vegetable impurities, if the refined article were as easily purchased?

UTILIZATION OF THE REFUSE LIME OF THE GAS WORKS FOR THE MANUFACTURE OF SAL AMMONIAC AND PRUSSIAN BLUE.—The lime used in the gas works for the purification of the gas becomes charged chiefly with two products of the destructive distillation of coal—results of the combination of its nascent nitrogen, viz., ammonia NH_3 and cyanogen NC_2. When steam is passed over such lime the ammonia escapes and may be passed through sulphuric acid, when sulphate of ammonia is obtained. By treating this with common salt (chloride of sodium) is easily decomposed into sulphate of soda and chloride of ammonium or sal ammoniac. The remaining lime, freed from the ammonia, contains the soluble ferro-cyanide of calcium; this is extracted by solution in water, and after filtration the clear solution is mixed with a solution of sulphate of iron, when the ferro-cyanide of iron or Prussian blue is precipitated. This is collected, washed, and dried.

DR. DETHEIR, of Constantinople, gives a description of the great bronze cannon used by Mahomet in the siege of Constantinople. Its weight was 80,596 lbs.; length, thirty feet; caliber, 46 inches; and the charge of powder required was 200 lbs. The balls used were stones, weighing 1,200 lbs. The American Rodman gun weighs 116,497 lbs.; has a length of 25 feet; caliber, 20 inches, and carries a ball of 1,000 lbs., with a charge of 100 lbs. of powder.

A SYSTEM of metallic ceilings, which consists in the application to the joisling of very thin stamped metal in ornamental embossed panels, has lately been invented. These stamped panels are fitted for every kind of decoration in color, and if inserted as plain surfaces may be used as the ground for every description of cartoon painting, combining with lightness and durabillty, artistic and ornamental effect.

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Contents:

(Illustrated articles are marked with an asterisk.)

*Machinery for Getting out Ship Timber..... 81
Coal Ashes as a Fertilizer..... 81
The Chemistry of the Heaton Process..... 82
Annul Report of the Commissioner of Patents..... 82
Boiler Explosion at Elizabethport, N. J..... 83
Manufactures in Holyoke, Mass.... 83
*Cottages for Laboring Classes.... 84
Social Clubs for Mechanics..... 84
*Improvement in Straw Cutting Machines..... 85
Lightning Rods..... 85
Influence of Sunflowers upon Miasms..... 85
The Zodiacal Light..... 86
The Polar Sea..... 86
The Hydrogen Gas Theory..... 86
Gas from Gasoline not Peculiarly Dangerous..... 86
A Rule for Finding the Exact (?) Length of the Circumference of any Circle..... 86
Digging and Dredging Machines Wanted in British Guiana..... 86
A Regulator for Ordinary Augers.. 86
The Photometer—Lecture by Dr. J. Ogden Doremus..... 87
Notes on the Velocipede..... 87
The "Kenosha" Steam Frigate.... 87
*Improvement in Cotton and Hay Presses..... 88
The Philosophy of Tea-Making.... 88
*The Stoltz Rotary Inkstand..... 88
Acarus Sacchari, the Sugar Insect. 88
Publication of the Patent Claims.. 89
Labor and Capital not Antagonistic..... 89
Birth of the Solar System..... 89
The Introduction of Steam Fire Engines..... 89
Why the Right Rather than the Left?..... 89
Glass Blowing—How Bottles are Made..... 90
Effects of Improper Diet..... 90
Archeological and Geographical.. 91
Management of Street Cars..... 91
Rat Proof Buildings..... 91
Transparent Colors..... 91
Prevention of Mildew in Cotton Goods..... 91
Obituary..... 92
Specimens of Large Belts..... 92
Manufacturing, Mining, and Railroad Items..... 92
New Publications..... 92
Answers to Correspondents..... 92
Recent American and Foreign Patents..... 92
Inventions Patented in England by Americans..... 93
List of Patents..... 93

PUBLICATION OF THE PATENT CLAIMS.

Our attention has been called to a paragraph, clipped from some unknown newspaper, which utters a complaint against the SCIENTIFIC AMERICAN, for omitting the publication of the patent claims. The intimation is thrown out that an effort is being made to induce some one to undertake their publication. What this effort consists of does not yet appear, but doubtless whenever it matures we shall know all about it, but of one thing we are perfectly assured from our own experience, namely, that such a publication can only be undertaken by the Patent Office with any hope of success, and there would be a loss unless one thousand subscribers could be obtained at ten dollars a year each. We have arrived at this conclusion by a careful calculation of the cost of paper, composition, labor, and material necessary for its printing and circulation.

The readers of the SCIENTIFIC AMERICAN are well aware, that, during the few years past, the claims of patents had become a serious burden upon its columns, and complaints were numerous that three or four pages each week were given up to claims, which in too many instances failed to convey an intelligible knowledge of the thing patented. After a thoughtful consideration of the whole subject, and not without some misgivings, we decided to test the matter, and in the issue of our anuual prospectus in December last, we announced our determination to try the experiment of discontinuing the claims.

In taking this step we had no other motive than to enhance the value of the SCIENTIFIC AMERICAN to the greatest number of its readers, and at the present moment it does not appear that any considerable number are dissatisfied with the course we have taken. Up to this time we have not received over a dozen letters of complaint, and our circulation is much larger than it was last year at this time. We have also received several letters commending our action. This is about the way the matter stands at the present moment. The question of expense has had nothing to do with our action in this matter. We desire simply to make the SCIENTIFIC AMERICAN as valuable as possible to all its readers, and we stand ready at any moment to resume the publication of the claims whenever it is made to appear that any considerable number of our readers demand it.

LABOR AND CAPITAL NOT ANTAGONISTIC.

The mistakes frequently made in discussing the relations of capital and labor, and the false views of these relations entertained by many superficial observers and illogical thinkers upon the subject, arise in great part from a consideration of them under abnormal circumstances. The natural relations of capital and labor are interdependent. The interests of neither can suffer without injury to the other, unless the normal and healthy condition of society has been disturbed by a force sufficient to destroy harmony of interest between both. Capitalists may individually regard labor, in some instances, as something to be got at the lowest possible price without regard to the rights of the laborer. But such an opinion can only be entertained by a man of narrow and superficial views of affairs. Equally narrow and superficial is the view of the laborer who demands for his work all that he can get without regard to the real value of his services. It is not our purpose at this time to recapitulate what we have so often written upon this subject; but we can not pass unnoticed a statement like the following taken from the *Detroit Union*. That paper asserts that capital and labor are ever at variance. "Capital has the advantage, because able to close her door on the outside world, and live in luxury until the laborer, whose family cry for bread, humbles all the manhood in him, and like a whipped spaniel he returns to his master. This may not be slavery in name, but it is even worse than the meanest slave, shackled and bound. Winter is upon us, and already scores of men are thrown out of employment; perhaps they have been blest with health and strength through the busy season, and have saved enough to barely support their families through the winter, and come out in the spring as poor as they were the year before, one year older, and with no brighter prospects for the future."

It is true perhaps (and only so in a very limited sense) that capital sometimes shuts its doors while labor cries for bread. But this is only temporary and compulsory with capital invested in material and machinery to convert material into marketable wares.

A mill may be closed for three months and a large number of operatives thrown out of employ. In the majority of such cases there is more or less privation on the part of labor, but capital suffers also. It is safe to say that the loss of the latter is in such cases greater in proportion to its value than that of the former.

It must be borne in mind that the present organization of society recognizes the rights of individuals to the possession of property if lawfully obtained. Such recognition implies the right of protection from lawless encroachments, and against loss, so far as personal management can avail to avoid losses. And further, the present organization of society forbids that any interference with the management of capital by its possessors, should be tolerated so long as it is in every respect legal. If these conditions are no longer tolerable, the only way to remedy them is to re-organize society from the bottom. But again because laborers suffer during the winter season, for want of employment, is it fair to charge their privations to the account of capital? To all intents and purposes labor is a commodity which is amenable to the law of supply and demand like any other. The world as a whole or this country by itself has never seen the time when it had labor enough. If labor was properly distributed there would to-day be a greater demand than could be supplied. The trouble is that certain departments are glutted for help, while others have not nearly as much as is needed. This is the fault of labor and not of capital. Millions of fertile acres in this country await cultivation and offer comfortable homes and abundant food and clothing to any who will work them, but so long as people prefer the filth and squalor of crowded cities with precarious employment, and high prices to the comparative ease of country living, we cannot see that capital is to blame for their poverty. If labor, especially unskilled labor, would adopt the policy, of getting away from the great centers of trade, the large cities, instead of overcrowding them, we should hear less of suffering for want of work.

The article above referred to alludes to the sufferings of seamstresses in large towns; but very few of these if asked to leave their present occupations, and perform housework where they would have plenty of food and comfortable shelter, with wages ample to supply clothing, would accept the offer. This is proved by the fact, that, although there is a scarcity of such labor, and the country constantly sends to the cities for its supply, it cannot be obtained. How is capital to blame for this. So long as human nature feels the effects of Adam's fall, so long there will remain those who will not scruple to profit from the necessities of others. Nothing can justify such a course; neither can anything justify the folly that exposes itself to imposition, and chooses want rather than comfort.

Such articles as the one from which we have quoted, are to be deprecated. Without touching upon the fundamental principles of existing things, or suggesting anything practical toward the amelioration of the working classes, they foster discontent, blind repining at inevitable consequence, and a disregard of public order and individual rights.

BIRTH OF THE SOLAR SYSTEM.

An article under the above title appears in the *Atlantic* for February. It purports to enunciate a new theory of the origin of the earth, sun, and other heavenly bodies. We should not, perhaps, strictly say origin, as the theory of cosmical vortices held in common by La Place and other philosophers is retained, but with the difference that in the new theory the cosmical matter is considered to be intensely cold, and its precipitation toward, and concentration around the vortices to be the cause of heat, which increases with the size of the orb thus formed until the body becomes self-luminous, in short becomes a sun. Thus the earth is, according to this doctrine, an embryo sun in a meteoric vortex, constantly growing by the attraction of cosmical matter to itself and its temperature constantly rising. The sun is considered to be also in a meteoric vortex, and to have derived his light and heat from the precipitation of meteoric matter upon his surface.

This theory is absolutely startling in its audacity. It stands in its principal points, directly opposed to the opinions of the greatest philosophers of the past or of the present. The earth has hitherto been supposed a cooling body. The cosmical nebula of LaPlace was matter indefinitely expanded which, upon condensation, formed rotative concentric rings which, upon further contraction, became broken into fragments assuming the spherical form. The chemical geology of Dr. J. Sterry Hunt, and the old school of geology, are simply absurd if the new theory be true. Jupiter, hitherto considered by astronomers as very much colder than any of the interior planets, is by the author of this remarkable doctrine, regarded as being so hot that water, as water, cannot exist upon the surface, being entirely vaporized and floating in his atmosphere.

The sun is, by and by, to become so hot that it will be reconverted into cosmical matter, but when its matter becomes so intensely cold as it must be before it can again fall as meteoric matter upon the surfaces of other bodies, its heat will have disappeared. What will have become of the heat? The author gives us no satisfactory answer.

Comets are masses of cosmical matter. When approaching the sun, this theorist tells us they act as lenses collecting a beam of light, which becomes visible by reflection from the particles of meteoric dust everywhere distributed about the sun for many millions of miles in all directions. But he does not account for the cases where comets have projected a tail *toward* the sun instead of away from it. Are comets in such cases concave reflectors instead of lenses? Man "little man," destined to be gradually roasted, will have disappeared long before the earth becomes a sun, to be finally reduced to chaos, and reconsolidated and rejuvenated, for thus run the perpetual cycles of the universe.

But we have not space to note at length all the strong or the weak points of this theory, among the latter of which not the least prominent is that man is merely an incident of creation, not its crowning work.

Evidently written, however, by a daring and speculative mind, and throwing down the gage of battle to all the systems hitherto accepted, and appearing in a periodical read by most thinkers in this country and many abroad, this "new theory" cannot fail to attract great attention and will probably give rise to much discussion.

THE INTRODUCTION OF STEAM FIRE ENGINES.

Steam power for extinguishing fires was in use in manufacturing establishments many years before it was employed on portable machines. Every factory of any pretensions had its steam-driven pump with hose and other attachments calculated to reach every portion of the establishment. About the year 1829 or 1830, Capt. Ericsson, then of the firm of Braithwaithe & Ericsson, London, Eng., built and exhibited a portable steam fire engine. In 1842 or 1843 he produced a similar engine in New York city and it was tested, but never brought into regular service. The writer remembers a great objection urged against its use that it burst any hose that could be made, which showed that the fault of want of success did not lie with the machine.

So far as we are informed, the credit of overcoming prejudice and successfully introducing the steamer in cities and large towns belongs to Miles Greenwood when mayor of Cincinnati, Ohio. Mr. Greenwood, being a man of great tenacity of purpose and a thorough mechanic, and having, moreover, the confidence of his fellow citizens, succeeded where only failure awaited others; and in consequence Cincinnati was the first city to adopt the steamer as a permanent portion of its fire department force.

The reasons why this most efficient agent—steam—was not sooner utilized for the protection of property from fires, may be summed up in one word, prejudice, prejudice born of ignorance. Fire and steam careering through the streets instead of inducing confidence and a feeling of security, inspired terror or created apprehension. Our municipal authorities, too, are not generally engineers or mechanics—and—the steamer does not vote.

The metropolitan fire deparment of New York city numbers 34 steamers of about 50 H. P. each, equal to 185 men, or in the aggregate 6,290 men, while the actual number of men employed even adding the 12 hook and ladder companies is only about 550: thus relieving 5,740 men from the labors, dangers, and exposure of the fireman, and allowing them to become producers rather than merely protectors of property. The time is past to question either the superior efficiency or the economic advantages of the steamer over the hand engine. As well might we return to the old hand press and the spinning wheel, print our newspaper editions of 100,000 daily and clothe the teeming millions by hand labor, as to discard the powerful agency of steam in the protection of our property from fires.

WHY THE RIGHT RATHER THAN THE LEFT?

It is somewhat attractive to attempt to trace, through the convolutions of custom and the traditional usages of men, the reason for every day habits that seem so natural as not to deserve notice, much less investigation; but, as nothing is created without an object, so we may assume that there is a reason for those of the habits of our kind which, being general, escape notice or criticism, but which, if isolated by the practice of individuals only, would arouse attention and awaken inquiry. Among these habits none are more marked or provocative of investigation than the habit of preferring the right hand or side to the left. In meeting an obstacle in walking it is easier to turn to the right than the left; in ascending staircases we prefer to take the right side, although that side may not have a rail for the hand, to assist the riser; we test the weight of an object by taking it in the right hand, and if we attempt the test with the left we find the result, as felt by the muscles, to be very different from that by the right hand trial. So in a hundred ways we always show our preference of the right over the left. It is not enough to account for this preference to say that general custom and personal habit make it imperative. To be sure, civilized and enlightened peoples, generally, are careful to instruct their children to use the right hand rather than the left, but this may be because manual instruments for performing all descriptions of work are constructed with a view to be used by the right hand. It is possible, however, that what may be considered the cause is only a result of some organic law that demands this sacrifice of

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the left in preference to the right. This view receives color from the fact that even among savage and uncivilized peoples the right is preferred. Among them, as among ourselves, the proportion of left-handed men is small. The Benjamites were considered odd by the children of Israel for their peculiarity of being left-handed. Either in ancient or modern times the proportion of left-handed men was always small.

Why does a man lost on a plain, where there are no guides for his course, make a circle in his efforts to go forward, turning always to the left? It may be said because the left being the less used side, and, therefore, less developed and weaker, must give way to the superior energy of the right; but this reason does not hold good, because we walk with our feet and not with our hands, and the feet are educated alike. We are ambidexters as regard our feet. In military evolutions we are taught to put the left foot first—to start off with the left foot; but in the dance we are instructed to start off with the right. Beside, we know of a person left-handed from his infancy, who, being lost in a snowstorm on Seekonk Plains, near Pawtucket, Mass., wandered in concentric circles, or spirals, for more than two hours, before being relieved, turning always to the left. Ambidexters, or those who can use equally well either hand, generally prefer to employ the right even when using an instrument not specially designed for the right hand. Those who like gymnasts, or pugilists, have to use the left with equal facility with the right hand, are compelled to submit to a severe course of discipline to attain equal force and dexterity with the left that they possessed with the right. The word just used—dexterity—perhaps, may be a clue to the question underlying these suggestions. Dexter, the right, sinister, the left. May there not be some meaning in these Latin terms and their derivations, physical, moral, and generally philosophical, beyond their application to manual operations? To be sure the Latin *rectus* may be offset against the other term, but the practice of the Romans, as well as our own justifies their interchange.

In some sense all mechanics and laborers are ambidexters. The wood-chopper should wield his axe with the right hand near the blade, as well as with it at the handle end; so the dresser of timber or the ship-carpenter, the adze; so the blacksmith's striker with the sledge, the farmer with the hoe, rake, or flail, and the housewife with her broom; but each and all prefer to give the dexter hand the precedence. Our guardian angel is the "angel over the *right* shoulder;" the sheep go to the *right*, the goats to the *left*; we give the *right* hand of fellowship, and of friendship, and in the latter case if circumstances demand the proffer of the *left*, the act is always accompanied wtih the palliating excuse "nearer the heart." Possibly this phrase has a physiological significance; muscular action or violent exertion should be kept as far from the delicate and active seat of life as possible for fear of too great a stress upon that organ.

Is there not something in this universal instinct—apart from custom—that demands investigation at the hands of our scientists, our social philosophers, and our moralists? It is not accident, circumstance, convenience, nor even tradition that compels us to prefer the right; what is it?

GLASS BLOWING.---HOW BOTTLES ARE MADE.

In a former article we treated of the composition of glass, and the construction of the furnaces in which the materials are melted preparatory to the operations by which the fused glass is made to assume the various familiar forms of glassware. The arrangement of these furnaces varies considerably, but a common form is that of a truncated cone with a chimney at the apex. Around and upon the interior of the base, the pots are placed, so that the workmen are distributed entirely around the furnace. The implements used in glass-blowing are of the simplest description and few in number. On this account a great degree of manual dexterity is required. During our recent sojourn at Pittsburgh, we took especial notice of the glass manufacture, of which nearly all branches are represented there, and with the readers permission we will step into some of the numerous establishments and witness, first the

MANUFACTURE OF BOTTLES.

Before we commence the description of glass-blowing, however, it will be proper to state the general principles upon which glass-blowing depends. If iron, or lead, or clay, in a plastic state, were the material desired to be worked, we should find the application of this method entirely impossible. What is it then about glass that makes it advantageous to work it in this manner? Why can it not be cast in the shapes required like iron? or why can not iron be blown like glass? A comparison of the properties of the two substances will elucidate the whole matter. Iron is one of the best conductors of heat, while glass is one of the worst. A body of iron unless very large, will when heated or cooled in one part rapidly become heated or cooled in all its parts. Glass on the contrary may be heated at any one point to redness, while parts very near to the heated portion remain cool. To illustrate this, suppose it to be required to blow a bulb upon one side of a straight glass tube. By directing a sharp pointed flame against the side of the tube at the proper point, a well defined disk of redness will be produced. The borders of the spot will show but little shading out of color, and the rod may be held in the fingers at only a very short distance from the heated disk. The spot thus heated has become plastic; and if one end of the tube be now closed with the finger and the other placed in the mouth, and a strong blast of air forced into it, the internal pressure upon the yielding spot will immediately expand it into a bulb. If now it were required to produce a depression in the bulb itself, it would only be necessary to reheat the center of the bulb, and exhaust the air from the tube when the external pressure of the atmosphere would press it inward. An iron tube could not be thus manipulated it would be impossible to heat it upon one side without heating the other, and the heat would also extend along the tube on either side of the point to which the heat should be directly applied. Beside this, the iron would never assume that doughy plasticity possessed by properly tempered and heated glass. The limit between the temperature when it becomes plastic and that at which it melts and runs down is very much narrower than that of glass. Beside the same conductive power which prevents heating in a given spot without also heating others, tends to cool down very rapidly any portion which is heated above the rest, while the reverse is true of glass. Again, air is a very bad conductor of heat—even worse than glass—and its low conducting power aids very materially in the process of glass-blowing. These facts borne in mind will enable the reader to perceive the rationale of the several manipulations we are about to describe.

The chief instrument used in the blowing of bottles, as well as all other glass-blowing, except fancy glass ornaments and toys, to be described subsequently, is what is technically known as the "pipe." It is a wrought-iron tube, from four to five feet long with a small knob at one end and a wooden handle at the other, terminating in a mouth-piece through which the air is forced; the bore extending entirely through the instrument. The end upon which the knob is fixed is used to collect a mass of the fused glass, to be fashioned into a bottle. With this simple instrument the workman approaches the "working hole" of the furnace, plunges the end into the fused glass, and rolling it around collects a ball of the material, and, immediately withdrawing it, blows a slight blast through the tube which expands a small hollow in the mass. After the ball has cooled a little, he plunges it in a second time, thus accumulating more material, and repeats this process until sufficient material has been taken up. As soon as the ball is large enough it is brought into one of the hollows of the "marver"—a wooden block in which hemispherical concavities have been excavated, the hollows being kept moistened with water. The mass is rotated in one or more of these cavities while a gentle blast is forced through the tube to keep open the internal opening. After a little the plastic mass assumes the form of a pear. This pear is now subjected, after reheating in the working hole to a complex manipulation. It is elongated by the swinging of the pipe to-and-fro like a pendulum, the centrifugal force thus generated, stretching it out longitudinally and, at the same time, it is kept round by turning the tube on its major axis, and expanded by a stronger blast than heretofore. By these means combined the metal assumes the form of an egg with a long tubular neck extending from the smaller end. As soon as this stage in the process is reached, the vessel is inserted into the mold—a block of iron containing a cylindrical hole the size of the desired bottle—and expanded to fit it by a strong blast, at the same time its neck is elongated by a succession of jerks, the inertia of the body of the bottle being sufficient for the latter purpose. By this time the yet unfinished bottle is so cool that a reheating is necessary. This time however, the bottom only is heated in order to give it the requisite concavity. As soon as it acquires enough plasticity, an assistant—usually a boy—who has in the meantime attached a small mass of fused glass to a rod of iron called a "punty," places this instrument with its little ball of glass as near the center of the bottom as possible and presses it inwards. As soon as the bottom becomes cool, the bottle is detached from the pipe by dropping a little cold water upon the neck as near the pipe as possible. This cracks it short off, and the bottle is now supported by the punty attached to the bottom. The neck is now reheated and a thread of hot glass wound around it at the top to form the rim, and a finish is given to it by rotating it; the punty resting across the edge of a bench upon which the workman is seated, who, while rotating the bottle, applies an iron instrument to the yet plastic glass. A boy then siezes the punty and carrying the bottle to the annealing oven detaches it by a quick jerk. This completes the work on an ordinary champagne bottle.

The process we have described is varied in some particulars in making other kinds of bottles, for perfumers, druggists, etc. We have often heard people express wonder that letters panels, figures of animals and other ornaments could be blown in the sides of bottles, but it is the simplest thing imaginable. The letters or other designs are cut in the side of the mold, which for fine work is generally made in halves and so adjusted that it can be opened or closed by a foot lever. The molds for such work are also formed so that the top closes with the exception of an aperture for the neck. The glass having been blown into a pear-shaped ball of the right size is placed in the mold and a sharp blast forces it into every depression. At some future time we may describe the modes of making pressed glassware, and window glass.

EFFECTS OF IMPROPER DIET.

The *Radical* for January contains an able and somewhat humorous review of a new work on health, by R. D. Mussey, M. D., which, not without show of reason refers a vast number of the real and imaginary "ills to which flesh is heir," to improper diet. The following extract from this spicy review will be read with interest by gourmands and Grahamites, as well as the intermediate grades of eaters who do not believe either in stuffing or starvation:

Now it is triumphantly asserted, by those who do not know, that everything about man shows that he is cut out for a large feeder. Especially they insist upon the fact that his teeth and digestive apparatus show that he combines the capacities of the three classes of animals—the fruit, grass, and flesh eaters. He leads the animal world in his capacity for assimilating all kinds of food—which shows, they argue, that it was intended he should be a great feeder. A cow has no power to import molasses into her pasture, or to make a plum pudding. Yet man has, and he can do it safely. But the doctor denies both the fact and its conclusion. He quotes from Cuvier, who says that "the natural food of man is fruit, roots, and the succulent portion of vegetables. His weak jaws and small canine teeth would not allow him, in a state of nature, to live on herbage or flesh." He alludes to the three tests which should determine the food for man—first, the make of his teeth; second, the make of his digestive apparatus; third, the eating habits of the kinds of animals nearest man. And he contends that these three marks show that man was intended for a vegetable eater. First, the teeth. The fore ones in carnivorous animals always meet. In man they do not meet, but overlap, as in all fruit-eating creatures. Besides, they are not strong, as the lion's or wolf's: but weak, as with the fruit eaters. Second, the side teeth are not long and projecting, as with the carnivorous, who thus can seize their prey; but are short, as with the fruit eaters. Third, the back teeth of man have the grinding motion which the fruit and grass eaters have, but which the flesh eaters do not have. Then they meet squarely. But those of the carnivorous overlap, so as to act as shears in cutting the flesh. Then they are not notched, as the carnivorous orders require in order that they may hold their food while eating it. In fact, he remarks that all omniverous quadrupeds, like the bear, the raccoon, the opossum, the hog, have no lateral motion to their back teeth. But man, in common with the cow and fruit eaters, has this peculiarity. Second, the form of the digestive apparatus. This, with the grass eaters, is always long and complex. With the flesh eaters, always short and simple. With the fruit eaters, as to length, it is intermediate between the two classes; as to simplicity, not so simple as the flesh eaters, not so complex as the grass eaters. But man has precisely the peculiarity here of the fruit eaters. His intestines are not short, like the flesh eaters; nor complex, like the grass eaters; but intermediate—showing, therefore, that he was meant to eat the grains and fruits. It is true, as the doctor remarks, some cows and horses have been known to eat and relish oysters and fish. But this fact does not show an original intention. But if a complex diet brings disease, as it always does to these animals, if the distillery-fed cow has her teeth diseased and crumbling, like those of the over-fed urchin, we must reason in the same way as to man. Third, the eating habits of the animals next to man. Now what animals are most similar to him, in make, in teeth, in digestive apparatus? The gorilla, the ourang, the chimpanzee. Teeth and intestines are similar. But these are all, with our other monkey friends, *fruit* eaters. Flesh is detrimental to their health. Now if all these facts do not show, as the doctor is inclined to think they do, that men and women are meant to be grain eaters *exclusively*, they certainly do show that we were not meant to be Falstaffs with unbounded stomachs. They do show that we were intended for simple food, like corn, or the apple or the potato; and that such food is compatible with high health. As the rejoicing invalid said, "If man could only know the inspiration that will come from the feed of rye porridge and oatmeal tea, he would pay higher prices for that than for the gorgeous lunch." They do show that our vast varieties of food, though produced by that glory of man, woman, are slightly demoniac in their origin and results.

We have hinted that often disease in its various forms could be traced to an unhappy digestion and the contents of the stomach. The doctor is sure of this cause, though not so wild as to think it the only one. Now all know the weak saws that a man will whine out when his lungs, nerves, or stomach, are in bad trim. "Oh! it is my poor constitution!" The poor constitution has to take it. "Confound these lungs! they were never good for anything. I inherited bad nerves from my good mother." (Not a very shining compliment). But the doctor would say, "Friend, your digestion may be at the bottom of part of the trouble." Don't be too fast. And to show this he proceeds to pile up a small mountain of cases, illustrating how diseases far off from the stomach can be reached at that pampered center. We will give a few of the cases. A lady teacher. For two months in constant nausea, utterly prostrated. A good emetic made her digestive apparatus give up the green leaves of some dandelions which she had eaten six weeks before. Presently got well. A fat old gentleman. Would have sharp cramps in his feet, and at times convulsions. The doctor would instantly relieve him by a little medicine administered to his sinning stomach. Dr. Wollaston, the English scientific man. Had once a most violent pain in his ankle. Presently he threw up a large ice cream, and the pain departed. A woman blind for three and a half months. Slight doses of guaiacum administered to the stomach brought back her sight in one week. A gentleman with terrific pains at the heart, an intermittent pulse, was sure his heart was diseased. His doctor, in one attack, sounded his stomach, found in it the greater part of a roast chicken. The chicken removed, heart all right. Then the common case of a cold. It is known that after eating there is always a secretion of mucus in the lungs and their tubes. And, with some not overhealthy, the secretion is apt to be very large. A very fat fowl, therefore, will often make a very foul throat. Cleanse the stomach, probably, and the cold will often and at once yield. A lady with disease of the liver. Often with most acute, fierce pains from the jaundice. Once, after a long cessation of pain, a single mouthful of her "pet ham" brought back the entire round of troubles. The ham subdued, she became all right. A lady who entirely lost her voice—of a very costive habit. A successful treatment of the digestive organs (reached through the kidneys, which were also sluggish), by a single dose of medicine, brought back almost instantly her voice. A young child, always ailing, weak, irritable, stupid, body covered with sores, with most voracious appetite. The greater the quantity of food, the greater the appetite. A diet exclusively of baked apples was commenced. Soon the passion, stupidity, voraciousness, sores, disappeared. A perfect recovery. A person fearfully afflicted with ulcers. No remedy. Cured through the stomach by a diet of bread and water. Asthma. A gentleman had a severe form of it. Seven bad attacks in six months. Dosed with morphine, etc. Cured perfectly by a spare bread-and-water diet, and in a short time. Dr. Gregory suffered from an attack of palsy. Several light shocks. Was of full habit. Turned about in his diet. Lived exclusively on bread, milk, vegetable diet, and in moderate quantities. Got well. Lived thirty years to be ninety-three. A case of epilepsy of fourteen years' standing. Violent medicines given, including arsenic. Treatment through the stomach. Milk and crackers. Recovery perfect.

Now we have reluctantly gone through with this dismal catalogue to show a great truth: that often, after raking heaven and earth to reduce a disease located far away from the unsuspected stomach, a proper treatment at that vital point will do the business. We could give many more such cases, for the doctor's book seems to sport with them. He runs them off as a Yankee does whittlings from a stick. But these are enough. We shall be glad if they teach sound sense. Tell us to seek causes where causes belong.

We concede that the teeth of man indicate that the

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natural food of man, *in his natural state*, is vegetable; but there is pretty good reason to believe that man is not living in his natural state, but in one much more elevated in all respects. In this state he needs many things easily dispensed with in his primitive condition, and a great physiological mistake is made by those who write upon the laws of health, if they ignore this fact. Hence we cannot fully concede that a strictly vegetable diet is what man needs in temperate climates, but we are quite ready to admit that many eat too much not only of meat but every thing of which they happen to be fond, and that this excess is the fruitful cause of disease. Having made this admission we shall continue to order our beefsteak for breadfast as usual, and so we judge will most of our own and Dr. Mussey's readers.

Archeological aud Geographical.

Putnam's Monthly for February gives the following items of interest:

A CURIOUS discovery, kept secret for fourteen years, has just come to light at Ravenna. The workmen engaged in digging a canal near the present railroad station, in 1854, found a skeleton with a breastplate of fine gold buried face downward. The precious piece of armor, which weighed six pounds, was broken up and the pieces secretly sold to jewelers. Two larger pieces, which appear to have been the shoulder bands, and are covered with chasing and enamel, have been given up by a jeweler in Faenza, but the remainders are probably lost. It is known that Theodoric buried the body of Odoacer, after his murder at Ravenna, face downward; and the Italian antiquarians suppose that this golden harness is really that of the first king of Italy.

A *Biblia Pauperum* is offered for sale in Augsburg, printed in the year 1420, from engraved wooden blocks; it belongs to the xylographic works which preceded and no doubt suggested the invention of printing. The illustrations are excellent specimens of medieval art, both in composition and engraving. Very few copies of this Bible are known to exist.

A MOST important archeological discovery has recently been made at Hildesheim, in Germany. Some soldiers who were digging rifle pits for a target shooting, came upon a quantity of silverware—enough to fill three wheelbarrows—all of the finest workmanship. There were vases, drinking cups, dishes, and candelabra, richly chased, in a style which was at first conjectured to indicate the Renaissance period. The fact that the field where they were found is still called "Pappenheim's Camp," led to the belief that they had belonged to that famous commander of the Thirty Years' War: but a closer examination has revealed the ancient Roman marks of weight and fineness of metal on many of the articles. As Hildesheim is not more than thirty miles distant from the *Winnefeld*, where Varus and his legions were annihilated by the Cheruskian chief Herrmann, in the year A. D. 9, it now seems probable that these spoils once belonged to the Roman general. The finest and best preserved article is a vase, twenty inches in hight, resting upon four griffins, between which are figures of boys in the act of spearing sea-monsters. There are two shallow dishes, one of which has a relief of a sitting Minerva, the other the infant Hercules strangling the serpents. Some of the drinking vessels are eight or ten inches in hight, the cups surrounded with wreaths of laurel, between which are masks, or the heads of animals. The last accounts from Germany say that Dr. Bendorf has succeeded in deciphering twenty-four inscriptions on the vases, which will shortly be published in the *Archeological Journal* of Gottingen.

GERHARD ROLFFS, the African traveler, has set out for Tripoli, whence he will forward by caravan the presents from the King of Prussia to the Sultan of Bornou. They consist of a gilded throne, a carriage, and weapons of various kinds. Afterwards, Herr Rolffs will spend three or four months in the exploration of the Cyrenaica—"the parts of Libya about Cyrene"—and the oasis of Jupiter Ammon. He is accompanied by an experienced photographer, and intends to make a complete series of views of the interesting Grecian, Carthagenian, and Roman ruins, which have heretofore been only very superficially explored.

THE discoveries made by the American Consul in Larnaca, Cyprus, are attracting the attention of archeologists in Europe. The identity of the modern village of Dali with the ancient Idalium is thereby established. It seems that the Consul was led to make excavations by the reports of a peasant living near the spot. The result was, the discovery of an ancient Greek necropolis at a depth of only three feet, under which were older Phenician graves, oven-shaped, and closed with great blocks of stone. In some of them were found vases with Phenician inscriptions and statuettes of women. The spoils of the Grecian tombs are exceedingly rich. Among the articles are golden necklaces and ear-rings, silver bracelets, copper, and bronze battle axes, lance, and spear heads, mirrors, tripods, coins, medallions, gems (especially of amethyst, ruby, and agate), glass vessels, statuettes, busts, and a great quantity of objects in terra-cotta. Many of the painted vases are three feet in hight. What disposition will be made of these treasures has not yet been announced.

AVENCHES, in Switzerland, is the ancient Roman Aventicum. Among its remains are traces of battles, a temple, a circus, and theater, from which the inhabitants quarry blocks for building from time to time. As M. Fornerod was digging in his field for building material he came upon a block of marble weighing more than a thousand pounds, upon the side of which, in a sunken panel, was an exquisite bas-relief, in perfect preservation. It represents Romulus and Remus under the wild fig tree, the she-wolf giving them suck, the nest of magpies, the laurel tree, and, finally, the sentinel goose. Connoisseurs who have seen this sculpture pronounce it one of the very finest of ancient art.

PROFESSOR NORKENSKJOLD, of the Swedish Polar Expedition, reports that after four desperate attempts to penetrate the ice, the violent storms and increasing cold obliged the expedition to return. The highest latitude reached was 82 deg. 42 min., which surpasses that attained by Parry. The Professor says: "During a cruise of a month and a half along the parallel of 82 deg., we have obtained admirable and unexpected results, concerning the temperature and ice-formation of the polar basin." All accounts agree that the amount of ice in the polar waters last summer was greater than ever before known.

PETERMANN'S *Mittheilungen* publishes a most interesting account of the land of the Njamnjams, and the southwestern watershed of the Nile, given by Piaggia, an Italian, and the French brothers Poncet. These travelers have penetrated to long. 24 deg. E.—seven degrees west of the White Nile, and nearly to lat. 1 deg. N. They have established the fact of the existence of another immense lake, lying on the equator, out of which flows a river, Babura, in a northwesterly direction, towards the Benui and Lake Tsad. Piaggia spent nearly two years among the Njamnjams, who are tailless, but cannibals. He was kindly treated by the chief, and was only prevented from reaching the new lake by civil wars. The account is one of the most important recent contributions to the geography of Central Africa. It is accompanied by a map of the region, by Dr. Petermann.

Management of Street Cars.

The following suggestions in regard to stopping street cars at stated intervals, extracted from Mayne Reid's new periodical *Onward*, meets with our entire approval: "The idea may not be new; but if adopted, we venture to say, it will give convenience to all—sparing the patience of the carried, and the strength of the creatures that carry them.

"Every one who rides in a street car must have observed two things; that there is a great deal of unnecessary delay caused by the frequent stoppings; and that it is these that try the sinews of the horse. It is not 'the pace that kills,' but the oft-repeated 'startings.' There are, therefore, two questions; one of convenience, the other of humanity; and both may be satisfied by a contrivance so simple as not to cost the corporation a single dollar—beyond what they may charge for the passing of an ordinance.

"This ordinance can be expressed in less than twenty words, thus: "Street cars to pull up (if required) at every second street from their last stopping place—but not between."

"Of course we refer to the cross streets—those carrying numbers.

"Let us look into the matter, and see how this regulation would work. There can be no great difficulty in coming to a conclusion.

"It would surely not be asking too much of the would-be-passenger in a street car to walk one block before getting in? It is only two hundred feet, and this is the longest distance required of him to play pedestrian, in fact the longest possible, for whether he step out of his own door, or come in from a cross street, he will be within two hundred feet of a stopping place, one way or the other.

"He goes then to the right or the left, whichever seems most convenient, and arriving at the known station, remains there till the car pulls up, when he gets in along with a knot of others who like himself have been in waiting.

"This method can cause no extra delay. On the contrary, the living freight will be taken in quicker than if caught up in driblets, each taking some time to scramble over slippery stones, and climb up the platform of the often awkwardly-placed car.

"And just as time is gained in the collection of the live parcels, so will it be in their delivery—by their getting out in batches instead of being dropped here and there in odd lots.

"He must be indeed dull who does not perceive the advantages of this arrangement; and lazy, or something worse, who would not work two hundred feet to aid in carrying it out. By doing so, he will not only accommodate others but himself, for the time saved would be alike beneficial to all. And above all would it benefit the poor horses, whose terrible contortions at each fresh starting is a sight sufficiently painful—even to those less sensitive than the humane Mr. Bergh.

"With most, the saving of time would no doubt be the great question; and this should be enough to influence the obtaining an ordinance. Merchants, of a morning, intending to go down town, could swallow their breakfast without burning their throats, while their clerks, preceding them, would keep better time at the counting house."

Rat Proof Buildings.

Can no one invent a style of building which shall be rat-proof? We have water-proof compositions for roofs, heat-proof material for walls, and fire-proof structures for the starvation of insurance companies and the disbandment of fire companies, but, thus far, no one has invented a mode of keeping rats out of buildings. And every year the plague of rats increases. They are like the flies, "if you kill one, a hundred will come to its funeral." They are increasing in numbers in Chicago at a fearful rate, and, unless something can be done, ere long they will assume the aggressive, and drive out the human population.

We heard only last week of a workman in one of our city elevators who essayed to ascend the upper flight of steps in the structure, and had mounted but half the distance when he saw on the top step seven or eight large rats; another step, and they turned round toward him in single rank, like infantry forming to receive cavalry. Another step, and no sign of retreat on the part of the rodents; he was afraid to proceed; he went back. It was only after he had beaten the top of the steps with a long stick, from the bottom, that the man dared to complete the ascent.

Chicago is peculiarly adapted to the multiplication of rats. The lumber used so largely on buildings and sidewalks affords them hiding places from which it is almost impossible to dislodge them, while our immense stores of grain form an extraordinary alimentative attraction. The peculiar needs of the situation stimulated inventive ingenuity in the matter of constructing swing bridges and moving ponderous buildings, perpendicularly and laterally. Is not the *gnawing* necessity great enough to incite the formation of some plan to protect ourselves and our homesteads from the plague of rats.

Even if it should not be necessary to fight down the rodents as a measure for the preservation of our lives, it is highly important to do it from economical motives. The rats which swarm in almost unaccountable numbers in our grain elevators and flour mills, and go out in troops with every grain-laden vessel, devour in the aggregate vast quantities of breadstuffs in the year. Ten rats consume as much as a human being, outside of the sustenance which they gain by eating each other. It is not too much to assume that ten thousand rats live in and around each of our seventeen elevators, consuming, in the aggregate, as much as would sustain the lives of seventeen thousand persons. Add to this the loss in flouring mills, and we have an aggregate loss of at least ten per cent of the amount of food necessary to feed the entire population of Chicago. Put this into figures, and the loss aggregates four hundred thousand dollars yearly. These figures will be fully doubled by the abstraction from the stocks of dealers, from the stables, and from the household stores, of all descriptions of food.

The man who will invent some plan of construction, which shall render a building rat-proof will confer an immeasurable boon on the community, and make a fortune for himself and his children's children.—*American Builder.*

Transparent Colors.

There are several colors that are natural transparents; others that may be made so by mixture.

The transparent colors are Terre de Sienna, Asphaltum, Dragon's Blood, Carmine, Rose Pink, Chemical Brown, all the Lakes, Gamboge, and all the Gums.

Semi-transparent—Umber, Vandyke Brown, Chrome Red, Emerald Green, Brunswick Green, Ultramarine, Indigo, Verdigris.

Remarks.—These colors should be ground very fine and spread on evenly.

If to be shown with a strong light two coats may be given; but if a subdued light one coat is better.

Transparent colors are purer if elutriated; that is, ground fine in water; let it settle; pour off the top part of the settlings; mix that up with more water; let it settle, and take the top half of that, which will be free from all sand and grit. If the pure part of the pigment, however, should be the heaviest, discard the top and use the bottom of the sediment. Usually, however, the purest coloring part settles upon the top.

Any of these colors will work more evenly, and be more transparent, if a small quantity of water be mixed while grinding.

Turpentine makes transparent colors work crumbly.

Bleached boiled oil, or white varnish, is the best vehicle for flowing evenly. Raw oil does very well, only that transparent colors are always difficult to dry.—*The Painter's Manual.*

Prevention of Mildew in Cotton Goods.

An investigation recently held in England upon the subject of the occurrence of mildew in cotton goods on shipboard, has resulted in the recomendation of the following means of preventing it: In the first place the size should be perfectly fresh—that is, not made from moldy flour, nor permitted to become either moldy or sour before use. This is absolutely necessary to prevent the formation or deposit of the spores or germs of mildew. It should also be free from extraneous mineral matters and especially deliquescent substances, which, however good the size may be in other respects, would attract moisture, and thereby contribute the only requisite (all others being present) for the development of fungi or mildew. In the second place, the compartment of the vessel in which the goods are stored should be well ventilated and heated. Shippers can, it is believed, obtain from the seller a guarantee of the purity of the size. If not, however, they have an easy remedy in their own hands. Any analytical chemist can with facility, in comparison with an equal weight of a standard piece of cloth, determine the purity of another piece. This can be done in a simple and almost mathematically correct manner, and, therefore, reliably for commercial purposes, by thoroughly drying, say fifty grains of the cloth, and noting the loss in weight, that is moisture, then igniting and weighing the ash. Indeed, for all practical purposes, merely igniting, weighing the ash, and comparing its weight with that of the standard would be sufficient. The increase over the standard multiplied by two, would give the per centage of mineral adulteration of the size. All the salts liable to be driven off by ignition, are too expensive to be used as adulterations. Inquirers into the size of the sale of adulterations for size, have ascertained the fact that Epsom salts are regularly sold for size admixture. One hundred and fifty tuns of this substance are disposed of weekly in Manchester for this purpose alone. This is a ponderous quantity, and its statement will be advantageous to those who are financially interested in the matter. Commercial magnesium sulphate, moreover, contains 51·21 per cent, of water, while, owing to its contamination with foreign salts, it is deliquescent, or attracts moisture from the atmosphere, without which fungi or mildew cannot exist. There are mineral substances that can be adopted with safety and if size adulteration must prevail, they should at once, at least for India goods, be substituted for Epsom salts.—*New York Mercantile Journal.*

WITHOUT SLEEP.—Five young men in Berlin lately made an agreement, for a wager, to see who of them could keep awake for a whole week. They all held out for about five days and a half, by drinking largely of strong coffee, and keeping up a constant round of active exercises and exciting amusements. At the end of that time two of them yielded to drowsiness; a third soon fell asleep while riding, tumbled from his saddle and broke his arm; a fourth was attacked by severe sickness, and compelled to retire from the list; the fifth held out to the end, but lost twenty-five pounds of flesh in winning the wager. Long ago, Frederick the Great and Voltaire made a similar experiment, making use of the same stimulant of strong coffee, but they did not succeed in driving away sleep for more than four days.

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OBITUARY.

Mr. Elbert Perce, a literary gentleman, as well as an inventor, and formerly an esteemed client of ours, died recently at his residence in Brooklyn, aged thirty-seven years. He was well known in literary circles as the author of the "Battle Roll of the Wald," and other works, and he was the inventor of the "magnetic globes," so well and favorably known to educators throughout this and other countries. He was a highly accomplished gentleman, and his amiable character gathered about him a host of warm friends, who will mourn, together with his afflicted family, his untimely end.

Specimens of Large Belts.

Messrs. Hoyt Brothers of Nos. 28 and 30 Spruce street, New York City, have lately finished two very large belts, a portion of an order for the American Print Works of Fall River, Mass. One is 228 feet long and 38 inches wide, double; the other 107 feet long by 36 inches wide, also double, each about five-eighths of an inch in thickness. Weight of the larger belt 1,998 lbs., and of the smaller one 810 lbs. One hundred and fifty of the choicest "buts" were selected from 3,000 hides, themselves sorted from about 9,000. The leather of these belts is wholly from domestic cattle, and tanned with oak bark only, at the tannery of the company in Cumberland, Md., no extraneous acids or hot liquors being used. At first price the value of the largest belt mentioned would amount to over $2,800. The material and workmanship are certainly creditable to the manufacturers.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

TIE SPOTTING.—The Chief Engineer of the Chicago, Burlington & Quincy Railroad, has invented a machine for "spotting" railroad ties. Tie spotting is cutting down the end, so that the outer part is a little higher than the inner, so that when the rail is laid it will incline inward. By placing a rail in this position, when the wheels of a car are run over it, the whole face of the rail comes in contact with the face of the wheel—a car wheel is always beveled; this distributes the friction over a greater space and of course reduces the wear. The machine is being made at the Aurora shops. The Aurora *Beacon* thus describes it: When finished, the machine will come out an engine on the track, run 200 miles a day, to where the track is being laid, or a pile of ties in readiness; the engineer will jump off, disconnect the connecting rods from the drivers, attach them to another wheel, start his machine, and as fast as four men can place ties on the little table, they will be carried by an endless chain under the knives, revolving 1,600 times each minute, and pass off the other side ready for the rails, each one the same in inclination.

It is stated that there are now before the Senate, lying on the table or referred to committees, no less than one hundred and ten bills, asking aid for the Pacific routes or connecting lines in the Territories and Pacific States. In the House there are one hundred and twelve pending. An approximate statement puts the amount of the bond subsidy asked for at about $250,000,000, and the land grants at 120,000,000 of acres.

A rigger, aged 85, recently walked from Duxbury to Kingston, Mass., worked hard all day, and in the afternoon rigged the masts and crossed the royal yard of the vessel, working 120 feet above the water. Sam Slick would say he was rather spry for his age.

One day last week the rollers in the eight-inch mill at J. Painter & Son's works, in West Pittsburgh, Pa., with one heating surface, made twenty-one thousand and forty-seven pounds of three-eighths inch round iron in eight and one-half hours.

ENORMOUS ROLLS.—The Birmingham (England) *Post* describes the casting of a pair of rollers weighing 18 tuns each or 36 tuns the pair. They are 15 feet 6 inches long and about 36 inches diameter, the largest in the world.

A bar of pure merchantable tin, weighing 85 pounds, has been turned out in San Francisco from ore from a tin mine at Temescal, San Diego county, California.

The works of the Williams Silk Manufacturing Company, at East Bridgeport, Conn., have been sold to a firm who will henceforth use them as a hat factory.

The expressage of a single edge tool manufactory in Waterville, Me., amounted in November to $54,462.

It is reported that mills for the manufacture of prints are soon to be built at Paducah, Ky.

The Columbia and Augusta Railroad is now completed to Graniteville, on the South Carolina Railroad.

Salem, Mass., is to have a new ship yard and a modern marine ship railway.

NEW PUBLICATIONS.

THE MONTHLIES.

The monthlies for February have mostly all come to hand. The ATLANTIC, always good, gives, among other lighter matter, a powerful article on "English Ritualism;" an essay on "The New Education," in which the relative merits of scientific and classical training are discussed, the success and failure of different scientific schools in the United States reviewed, and some valuable suggestions made. An article entitled "Birth of the Solar System," in which an entirely novel and most remarkable cosmical theory, which we think may, and probably will be severely handled by the philosophers, and the second part of the essay on "Consumption in America."

The ECLECTIC has outdone itself in its present issue, and deserves to be ranked at the head of all periodicals of its class published in this country. Its selections are of the highest character from beginning to end.

In PUTNAM'S MONTHLY, which fully sustains its excellent character in this number, we find a well-written article on "Work, Wages, Combinations," etc., which we consider as weak in logic as strong in rhetoric; "A Sermon at Notre Dame" is a splendid article, in our opinion the best thing in this number.

In the GALAXY the best things are "Coffee and its Adulterations in New York," and "The Grammarless Tongue," in which latter many excellent points are made and some mistakes. The circulation of the "Galaxy" is rapidly going up.

By the way, why do not publishers cut the leaves of their publications? It costs next to nothing to do it with the proper machinery, and it is a real annoyance to perform the cutting by hand. Most certainly if pausing before a news-stand we were about to choose a magazine, we should incline to the ATLANTIC OR GALAXY rather than to one of equal merit with uncut leaves.

SECRETS OF BEE-KEEPING. By K. P. Kidder, Practical Apiculturist, Burlington, Vt.

This is the title of very entertaining and instructive little volume of 132 pages. Nothing in the insect world has attracted greater attention from the student of nature than the habits and marvelous instincts, if instincts they are, of the honey bee. The work before us seems to be admirably adapted to the wants of bee-keepers, especially those who have not a large experience to guide them in the care of these diminutive but industrious workers. The price of the work is seventy-five cents, and may be obtained of the author.

THE AMERICAN YEAR BOOK AND NATIONAL REGISTER FOR 1869.

Messrs. O. D. Case & Co., Hartford, Conn., proposes soon to publish the above named work, which will embrace a great variety of information—astronomical, historical, political, financial, commercial, together with a general view of the United States Government, with educational, religious and industrial statistics. It is intended to be a permanent work, and will be valuable to every citizen. The work will be sold by traveling agents.

THE TEXAS ALMANAC FOR 1869, AND EMIGRANT'S GUIDE. D. Richardson, No. 12 Barclay street, N. Y.

This work contains a great deal of information concerning the climate and resources of Texas—useful to persons who desire to emigrate to that State.

THE ARCHITECTURAL REVIEW AND BUILDERS' JOURNAL.

The seventh number of this excellent periodical is at hand. It fully fulfills the promises made in its prospectus, both in character of the matter and typography. Its department of Practical Carpentry and Joinery is alone worth the subscription price to any mechanic; while its general articles on all subjects connected with architecture are carefully and skillfully prepared by a master hand. The high character of its designs is admitted by all who examine them. Published by Claxton, Remsen & Haffelfinger, 819 and 821 Market street, Philadelphia.

Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, an Extra Charge will be made.

Ask for Olmsted's oiler,—the best made. Sold everywhere.

Woodruff & Beach's, or Corliss 75 to 100-H. P. engine wanted, first-rate order. Address R. W. M., Box 3329, New York.

Wanted—parties to manufacture a small article of wood and wire. A large number wanted. Address E. P. Hall, 2108 Brandywine st., Philadelphia, Pa.

Machinists! Meinhard's improved iron planing machine. For machine, with improvement, inquire at Gould Machine Company, Newark, N. J., or Warehouse, 119 Liberty st., New York. Illustrated in Scientific American Vol. XVIII., No. 6, page 81.

A new 16x24 and 10x18 engine for sale low by Albertson & Douglass Machine Co., New London, Conn.

An interest in one of the most valuable patents ever issued will be exchanged for Western or Southern lands. Territory to the amount of $10,000 has already been sold. Address Dr. Carpenter, Newark, N. J.

Peck's patent drop press. Milo Peck & Co., New Haven, Ct.

The manufacture and introduction of sheet and cast metal small wares is made a specialty by J. H. White, of Newark, N. J.

For descriptive circular of the best grate bar in use, address Hutchinson & Laurence, No. 8 Dey st., New York.

Pocket repeating light, with improved inflammable tape. Send for circular to Repeating Light Company, Springfield, Mass.

An experienced engineer, who for years has been engaged as superintendent and mechanical draftsman in a machine shop, wishes a similar position in some establishment. Good references given. Address Engineer, Postoffice Box 3443, Boston, Mass.

American Needle Company, general needle manufacturers, and dealers in sewing-machine materials. Hackle, gill, comb, card pins, etc., to order J. W. Bartlett, Depot 569 Broadway, New York.

See A. S. & J. Gear & Co.'s advertisement elsewhere.

For steam pumps and boiler feeders address Cope & Co., No. 118 East 2d.st., Cincinnati, Ohio.

Responsible and practical engineers pronounce the Tupper Grate Bar the best in use. Send for a pamphlet. L. B. Tupper, 120 West st., N.Y.

Iron.—W. D. McGowan, iron broker, 73 Water st., Pittsburgh, Pa.

For sale—100-horse beam engine. Also, milling and edging machines. E. Whitney, New Haven, Conn.

Millstone-dressing machine, simple, durable, and effective. Also, Glazier's diamonds, and a large assortment of "Carbon" of all sizes and shapes, for all mechanical purposes, always on hand. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

For solid wrought-iron beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for Lithograph, etc.

N. C. Stiles' pat. punching and drop presses, Middletown, Ct.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

Winans' boiler powder, N. Y., removes and prevents incrustations without injury or foaming; 12 years in use. Beware of imitations.

The paper that meets the eye of all the leading manufacturers throughout the United States—The Boston Bulletin. $4 a year.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; beside, as sometimes happens, we may prefer to address correspondents by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

J. G., of N. Y., asks "what is the rule in relation to the employment of eccentrics and cranks, a given amount of motion and power being required, which is preferable? and in what cases is one better than the other?" The eccentric is a modification of the crank. A steam engine may have its reciprocating motion converted into rotary by an eccentric instead of a crank, as some foot or treadle lathes are driven; but while the crank, to produce the slight throw required for this purpose, could not be easily attached to the main shaft the eccentric could. Both crank and eccentric are means of transmitting rotary into reciprocating motion and *vice versa*, and the choice of either of these means is to be governed entirely by the circumstances of the case.

A. R., of D. C.—The sum of the latent and visible heat of steam is found by adding the latent heat 967°·5, to the visible heat 212°. It is strictly 1179°·5, or in round numbers 1180° as given by Professor Silliman in the lecture referred to.

W. E. B., of Pa.—The circumference of an ellipse is found by adding together its major and minor diameters, dividing by two, and multiplying the quotion by 3·1416. Any of the ordinary text-books on Geometry will serve your purpose.

A. M. W., of Conn.—To make paint dry quick, use a large proportion of Japan varnish in mixing.

D. L. P., of Pa.—To polish raw wood there is nothing better than shellac dissolved in alcohol rubbed in thoroughly with a rag until dry. The solution should be quite thick, as that will save labor.

F. A. C., of N. H.—We think there can be no doubt that the impetus of a shot is greatest at the instant of its leaving the muzzle. If experiment should prove that its penetration is greater at a distance than near the muzzle, it must be due to other circumstances than its initial velocity.

M. A., of Ky.—All patented methods, the one you refer to among the number, are the exclusive property of the patentee. For a right to use the one of which you speak, address the patentee. Women may produce many useful as well as beautiful articles of household convenience with twigs, dried leaves, pine cones, seeds of vegetables, bark, roots, etc., twine, glue, varnish, a pocket knife, and a pair of scissors. Not a very extensive or expensive stock, but capable of being wrought and combined into very elegant articles. Natural taste and patient application will suggest patterns and insure success.

J. S. M., of Me.—We do not think that a properly tempered band saw is peculiarly liable to break. The fact that they are used for sawing iron would seem to preclude the idea of their easy breaking. There are no patents on the band saw. It is an old device, beyond the reach of patents, except for its adaptation to particular work, or some peculiar arrangements of its accompanying parts.

C. G., of Ohio.—Gum Dextrine or British Gum is the substance used for gumming envelopes and stamps. You can purchase it ready made or can make it yourself, by adding to starch 11-4000 of its own weight of strong nitric acid, diluted with water enough to moisten the starch, drying the mass, by a very mild heat, pulverizing coarsely, and heating in air raised to 160° Fah., pulverizing again finely, sifting, and finally reheating to 228° Fah. This process will give you a fine article. To use it dissolve in water to the proper consistency.

N. C. B., of Canada.—No definite rule can be given for proportioning irons for castings, as the proportions must vary according to their thickness. A thin casting will be very much harder than a thick one of the same composition. Judgment matured by experience must be your guide. The more old iron you mix with the pig the harder your castings will be. For machinery never use less than about twenty-five per cent, nor more than seventy-five per cent of old metal, and between these extremes you will by experiment find the proportion required.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

PLOW.—Joel H. Jones and Henry P. Jones, Herndon, Ga.—This invention comprises several important improvements in the manner of constructing plows, among which may be mentioned a new construction of the swingletree, a new form of plow standard, a new method of bracing said standard, a new form of the plow handles, a new mode of fastening the handles, standard, and beam, and a new form and arrangement of harrow to be used in connection with the plow.

WASH BOILER.—W. D. Hillis, Elgin, Ill.—This invention relates to that class of wash boilers in which the steam generated in the lower parts of the vessel is made to force a column of hot water up and discharge it upon the clothes, and the present improvement consists in a new form of the piece which is placed in the boiler to confine the steam and direct the upward current of water.

COMBINED BOOT HEEL AND SPUR.—C. F. Woodruff, Newbern, Tenn.—This invention is a neat and simple combination of metallic boot heel with sheathed spur, the parts being so constructed and operating that while the spur will always be in place and ready for use, it will not be in the way of injuring the clothing, carpets, etc., or of receiving injury from stones or from the pavement.

SHEET METAL CAN.—Conrad Seimel, Greenpoint, N. Y.—This invention relates to new and improved method of fastening the tops and bottoms of sheet metal cans, and it consists in the peculiar construction of the joint for the purpose, so as to form a rigid, firm, and tight connection, at slight expense and with but little labor.

HORSE SHOE.—H. S. Hitner, Marble Hall, Penn.—This invention relates to that class of horse shoes in which a plain curved plate without calks, is fastened to the hoof, and to this plate the shoe, bearing either sharp or dull calks, is attached by means of screws. This improvement relates to a new device for strengthening the shoe and attaching it to the curved plate more firmly than has been done heretofore.

GEOGRAPHICAL GAME.—Levi Branson, Raleigh, N. C.—The object of this invention is to produce an interesting and agreeable game, the successful playing of which shall depend entirely upon the skill of the player, and which cannot be played by any one without his acquiring thereby a vast amount of correct information as to the conformation, extent, population, and resources of the geographical divisions and subdivisions of the earth, or of some particular continent, nation, or territory thereof.

BRICK MACHINE.—David Packard, St. Joseph, Mo.—This invention relates to a new and improved machine for molding and pressing bricks, and it consists in a peculiar construction and arrangement of parts.

BEE HIVE.—Calvin R. C. Masten and Abram D. Van Vlack, Pleasant Valley, N. Y.—This invention relates to a new and improved bee hive, and it consists in a novel construction and arrangement of the same.

CULTIVATOR.—J. H. Coleman, Columbia, Mo.—This invention relates to a new and improved cultivator for plowing or cultivating crops grown in hills or drills, and it consists in a novel construction and arrangement of the plows or shares and manner of applying the same.

GAS REGULATOR.—Samuel P. Mervine, Philadelphia, Pa.—This invention relates to a new and improved method of regulating the pressure of gas, and it consists in the arrangement of a float in a gas holder, which float is provided with a hollow perforated valve and certain gas apertures and gas channels.

BRAKE BLOCK HOLDER.—Arthur W. Dorr, Lake Valley, Cal.—This invention relates to a new and improved device for securing brake blocks to the brake bars of railroad cars, whereby the blocks are firmly held in position, old ones readily removed, and new ones secured in their place.

BREECH-LOADING FIREARM.—Henry Carter and George H. Edwards, Stepney, England.—This invention is chiefly applicable to that class of breech-loading firearms which close with a sliding rotating bolt provided with a projecting hand lever.

BURGLAR PROOF LOCK.—G. W. Dana, Racine, Wis.—This invention relates to a burglar proof lock, and is improvement on a lock for which Letters Patent were granted bearing date December 27th, 1859.

TEA-KETTLE.—Joseph H. Downing, Healdsburg, Cal.—This invention relates to a new and useful improvement in kettles for boiling water and other liquids, and it consists in attaching to the handle or bail of such kettle, straps or pieces of metal, in such a manner that the lower ends of such pieces will rest on, or nearly on, the cover of the kettle when the bail is in a vertical position, and so that when the bail is turned down the cover can be removed.

MACHINE FOR GRINDING THE SICKLES OF HARVESTERS.—Milton Fowks, Leeds, N. Y.—This invention relates to a new machine for sharpening the cutter bars of mowing and reaping machines, and consists in the arrangement of machinery for imparting combined reciprocating and rotary motion to the grindstone, so that it will move along the cutting edges and at the same time sharpen them. The invention consists also in beveling the grinding edge of the stone towards both sides, so that it will at once grind two diverging edges of the sickle. The invention also consists in providing for the vertical adjustment of the stone so that it may be lowered when worn smaller by use.

STOP-COCK.—H. P. Kreiner, Berlin, Prussia.—This invention relates to a new manner of making the spigot or stopper of a faucet or tap fit tight in its seat, and consists in making such spigot or stopper of two or more longitudinal pieces or sections, which are pressed against the sides of the enclosing pipe by means of springs interposed between them. By this invention

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the spigot will always be perfectly tight, even when it is somewhat worn and will not be liable to get out of order.

GENERATING HEAT BY FRICTION.—Pedro Vera, Bogota, United States of Colombia.—This invention consists in revolving metallic disks in contact with metallic diaphragms; said metallic disks and diaphragms being combined and arranged in one or more columns, or series, and confined in a properly constructed shell or casing.

THILL COUPLING.—Rutland M. Garrettson, Sag Harbor, N. Y.—This invention relates to the manner of attaching the thills of a carriage to the axle, and it consists in forming a divided clip for the thills, and in securing the same by a screw bolt.

SURGICAL INSTRUMENT.—Silas J. Howell, Orange, Mass.—This invention relates to an instrument for extracting bullets in the treatment of gun-shot wounds, and for other purposes, and consists in operating expansible lever jaws by a rod sliding through a tube and forced against a spring.

CAR BRAKE.—James H. Beatty, Franklin, Penn.—This invention relates to an improvement in brakes for checking or stopping railroad cars or trains when the same are under motion, and which brakes may be applied to land carriages if desired. The said improvement affording amost efficient and expeditious means for stopping railroad cars.

STRAW CUTTERS.—Charles H. Brown, Bloomingburg, N. Y.—This invention has for its object to furnish an improved machine for cutting straw, hog corn stalks, vegetables, etc., which shall be simple in construction and effective in operation, and which may be easily adjusted to cut the straw, hay, or stalks of any desired length, or the vegetables of any desired thickness, whether said vegetables be large or small.

STOVEPIPE SHELVES.—S. J. Anderson, Cazenovia, N. Y.—This invention has for its object to furnish a simple, convenient, adjustable, and detachable device for attachment to stovepipes for the reception of dishes or other things that may be desired to be kept warm.

COMPOSITION FOR PAINTING STONE COPING, ETC.—James Judge, New York city.—This invention has its object to furnish an improved composition for painting stone coping upon roofs, in areas, and in other situations, which will make the joints perfectly water tight, and will beunaffected by changes of temperature.

BOX SETTER FOR WHEEL HUBS.—F. W. Dexter, Randolph, N. Y.—This invention relates to the boring out of a conical set in wagon hubs, to receive or "set" the axle box therein; and combines a number of devices which conduce to provide a more convenient and desirable apparatus for the purpose than has heretofore been known or used.

RULER AND COURSE INDICATOR FOR NAUTICAL PURPOSES.—Reuben A. Briggs, New York city.—This invention relates to a new apparatus for laying down the course of vessels, and for finding directions on charts. It is so arranged that it can also be used for a ruler. It consists in pivoting a protractor to a rule, so that when the edge of the rule is placed between the required points of the chart, with the center of the protractor upon one of the meridians or lines of latitude, the direction of the rule on the chart, and the course to be steered will be readily obtained by means of the protractor.

APPARATUS FOR SMOKING MEATS.—Robert Thornton Burnett, Port Jefferson, N. Y.—This invention has for its object the construction of a smoking apparatus for all kinds of meats, in which all the smoke of a fire may be utilized for the desired object.

MANUFACTURE OF WROUGHT IRON.—T. C. Coleman, Louisville, Ky.—This invention relates to an improved process for the manufacture of iron and consists in the manner of mixing and combining iron cinder or other flux with molten pig metal previously to working it into puddle balls.

DRILLING AND BOLT TAPPING MACHINE.—Chas. W. Coe, Fentonville, Mich.—This invention consists in a new and improved means for feeding the drill or screw-cutter to its work, whereby much friction is avoided and a very desirable implement obtained.

KNITTING MACHINE.—G. M. Patten, Bath, Me.—This invention consists in an improved arrangement of means for reversing the movement of the reciprocating comb bar; also an improved arrangement of means for operating the looper; also an improved method of operating the index mechanism by frictional contact with the comb bar, and also several other improvements of details.

CAR COUPLING.—W. H. Hall, Malone, N. Y.—This invention consists of a coupling head or bunter formed with a vertical longitudinal slot, extending through the upper part of the bunter down to the cavity of the same, and in which is pivoted a coupling link of peculiar construction, and which is a link continuous with, and forming part of a coupling pin through which latter the pivot bolt of the bunter passes.

MACHINERY FOR DRESSING AND SHAPING STONE.—Jos. Ellicott Holmes, New York city.—In this machine a vertical cutter head is arranged to slide horizontally to and fro, along the side of a platform whereon the stone to be dressed is clamped, and to oscillate on its vertical axis by which latter movement the cutters are caused to act on the stone, as they move from end to end thereof. The cutter head may be adjusted to oscillate from right to left, or *vice versa*, as its direction of motion along the stone is changed. The stone is turned on its sides as each face is dressed to present the other faces, and the said faces may be dressed to any required angle relatively to each other. Robert Gray, of Erie, Pa., has an operating machine which he has recently brought from England. An illustration of the machine is in course of preparation, and will be soon published in these columns.

GROOVED IRON AND OTHER METALS.—Benj. F. Morey, Clinton, Ind.—This invention relates to a new and useful improvement in iron and other metals for wagon tires and other purposes of a similar nature; and it consists in forming one or more groves on one side of the bar of iron, steel, or other metal, which grooved side is designed to form the interior surface of the tire band or other article for which the groved metal may be used.

SKATING FLOOR.—Wm. S. Nelson, St. Louis, Mo.—The object of this invention is to provide a surface or floor suitable for skating upon with common runner skates, and which is designed to be laid in public halls, rinks parks, and private rooms for the purpose of skating upon.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

3,436.—SEWING MACHINE.—A. Macaulay, Northampton, Mass. November 12, 1868.

3,502.—BOXES FOR TRANSMITTING PATTERNS, SAMPLES, ETC.—E. Moore, Brooklyn, N. Y. November 18, 1868.

3,551.—PRESSES.—J. N. Smith and H. B. Geer, Jersey City, N. J. November 23, 1868.

3,643.—MACHINES FOR OPENING AND CLEANING COTTON, ETC.—R. Kitson, Lowell, Mass. November 30, 1868.

3,651.—IMITATIONS OF, AND SUBSTITUTES FOR WOOD, IVORY, STONE, AND OTHER HARD SUBSTANCES.—D. Blake, Albany, N. Y. November 30, 1868.

3,671.—REFLECTOR.—A. Hubbell, New York city. December 2, 1868.

3,674.—CHAIR.—T. Sampson, Providence, R. I. December 2, 1868.

3,686.—KNITTING MACHINE.—J. G. Avery, New York city, and S. V. Essick, Worcester, Mass. December 4, 1868.

3,687.—MACHINE FOR CUTTING EDIBLE ROOTS.—S. Van Ransalear Hakes, W. B. McCrury, and W. S. Patrick, Flint, Mich. December 4, 1868.

3,692.—NOZZLES FOR OIL CANS, ETC.—H. Page, Boston, Mass. December 4, 1868.

3,722.—ROOMS AND APPARATUS FOR PHOTOGRAPHING BY ARTIFICIAL LIGHT.—G. K. Proctor, Salem, Mass. December 7, 1868.

3,747.—BLOCKS FOR SUPPORTING VESSELS IN DOCKS.—J. T. Parlor, Brooklyn, N. Y. December 9, 1868.

3,762.—STEAM BOILER.—C. Nelson, Troy, N. Y. December 11, 1868.

3,786.—TREATMENT OF ORES, OF GOLD AND SILVER, AND OF QUARTZ AND SILICIOUS SUBSTANCES, IN ORDER TO OBTAIN AND APPLY THE PRODUCTS THEREFROM TO VARIOUS USEFUL PURPOSES.—A. L. Fleury, Boston, Mass. December 15, 1868.

3,792.—MACHINERY FOR TRANSMITTING POWER AND MOTION.—C. C. Hull, Williamsburg, N. Y. December 15, 1868.

3, —PROCESS OF RESTORING OR RENEWING WORNOUT FILES.—T. Thornley and G. B. Wing, Massachusetts, U. S. December 17, 1868.

3,803.—MACHINERY FOR GINNING, BURRING, AND CLEANING COTTON AND OTHER FIBROUS SUBSTANCES.—G. Sargent, Graniteville, Mass. December 15, 1868.

3,852.—TEA AND COFFEE URNS, AND OTHER SIMILAR VESSELS.—G. Jones, New Haven, Conn. December 18, 1868.

3,872.—LADIES' SKIRTS.—C. Langdon, New York city, and W. S. Thomson, London, England. December 19, 1868.

3,890.—BANDAGE FOR FEMALES.—A. Hubbell, New York city. December 21, 1868.

3,892.—SPRING PAUL WASHER.—P. Justice, Philadelphia, Penn. December 21, 1868.

3,900.—CURRYING AND DRESSING LEATHER.—T. Saunby, New York city. December 21, 1868.

3,941.—STEAM VALVES AND THEIR ADJUNCTS.—E. H. Ashcroft, Lynn, Mass. December 24, 1868.

3,950.—MACHINE FOR PEGGING OOTS BAND SHOES.—D. C. Rogers, Conway, Mass. December 28, 1868.

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Patent Solicitors, No. 37 *Park Row, New York.*

85,892.—WATER WHEEL.—Edwin Adams, Orelewa, Cal.

85,893.—FILLING FOR FIREPROOF SAFES AND CHESTS.—William Alford (assignor to himself and James H. Chambers), Philadelphia, Pa.

85,894. — SAWING MACHINE. — Richard Atkinson, Cleveland, Ohio.

85,895.—SLEIGH.—S. R. Bailey, Bath, Me.

85,896.—SLEIGH BOTTOM.—S. R. Bailey, Bath, Me.

85,897.—BREECH-LOADING FIREARM.—Cyrus W. Baldwin, Boston, Mass.

85,898.—HOLDBACK.—Alvin C. Beckwith and George H. Graham, Oriskany, N. Y.

85,899.—MACHINE FOR APPLYING STRENGTHENING PATCHES TO BUTTONHOLES OF COLLARS.—E. F. Bradley, Derby, Conn.

85,900.—WATER METER.—John A. Bradshaw and William H. Brown, Lowell, Mass.

85,901.—ADJUSTABLE EXTENSION PEDAL FOR PIANOS, ETC.—Albert G. Brewer, Hopkinton, Mass.

85,902.—BUT.—Thomas W. Brown, Reading, Pa.

85,903.—BUNG.—Walter Calhoun, West Troy, N. Y.

85,904.—IRON PLANER.—Charles Carr, Boston, Mass., assignor to Boston Machine Company.

85,905.—LET-OFF MECHANISM FOR LOOMS.—Benjamin F. Carter (assignor to himself and S. S. Cook), Woonsocket, R. I.

85,906.—METHOD OF PREPARING NITRO-GLYCERIN.—Stephen Chester and Otto Bürstenbinder, New York city.

85,907.—SEED SOWER.—Sanford S. Clark and John G. Whitney, Independence, Iowa.

85,908.—CARPET STRETCHER, TACK DRIVER, AND PULLEY COMBINED.—Lucius Colby, Morrisville, Vt., and John D. Gilman, Boston, Mass.

85,909.—WATER CLOSET VALVE.—William S. Cooper, Philadelphia, Pa.

85,910.—CONDENSER FOR SPIRITS, STEAM, AND OTHER VAPORS.—Alonzo W. Cram, St. Louis, Mo.

85,911.—MACHINE FOR CUTTING SHINGLE BANDS.—John H. Crawford and William H. Crawford, Oshkosh, Wis.

85,912.—MODE OF DYEING COTTON, ETC.—Adolphe Jean James d'Andiran, Mulhouse, France.

85,913.—FREEZING BOX FOR FISH, ETC.—William Davis, Detroit, Mich.

85,914.—APPARATUS FOR PRESERVING AND TRANSPORTING FISH.—William Davis, Detroit, Mich.

85,915.—MUCILAGE BOTTLE.—Baltis De Long, Washington, D. C.

85,916.—REELING AND MEASURING YARN.—William A. Ditson, Girard, Ill.

85,917.—MACHINE FOR STRAIGHTENING RAILROAD BARS.—Sarah Downing, Grafton, W. Va., administratrix of the estate of Thomas M. Downing, deceased, assignor to Alpheus D. Casteel.

85,918.—FOLDING EXTENSION TABLE FOR SEWING MACHINES.—John F. Elliott, Cincinnati, Ohio.

85,919.—TRUNK.—Maurice Fitzgibbons (assignor to himself and Ralph S. Jennings), New York city.

85,920.—MILK COOLER.—Abiathar Foot, Warren, Conn.

85,921.—LAMP SHADE.—Frederick E. Foster, Cressona, Pa. Antedated January 7, 1869.

85,922.—PLAITING FABRIC.—William Fuzzard, Chelsea, Mass.

85,923.—THILL COUPLING.—Rutland M. Garrettson, Sag Harbor, N. Y. Antedated January 2, 1869.

85,924.—SCHOOL DESK.—Ernest W. Gilles and Jules Wendell, Oswego, N. Y.

85,925.—CARPET STRETCHER.—John B. Greenalgh, Providence, R. I.

85,926.—PITMAN.—Manasseh Grover, Clyde, Ohio.

85,927.—MODE OF MOUNTING ARTIFICIAL TEETH.—Robert Haering, Melrose, N. Y., now residing in Montreal, Canada, assignor to John B. Newbrough, New York city.

85,928.—PEN HOLDER.—David E. Hall, Detroit, Mich.

85,929.—BAND FASTENING.—David E. Hall, Detroit, Mich.

85,930.—CONSTRUCTION OF ELEVATOR BUCKETS.—Nehemiah Hawkins, Chicago, Ill.

85,931.—STOVEPIPE DAMPER. — Theophilus Hessenbruch, Philadelphia, Pa.

85,932.—FRUIT JAR.—P. M. Hinman, Rochester, N. Y.

85,933.—CHURN.—Timothy H. Hutchinson, Gorham, N. H.

85,934.—PORTABLE COOKING APPARATUS.—George B. Isham, Burlington, Vt.

85,935.—SLED.—Amasa C. Kasson (assignor to himself and Nelson C. Gridley,) Milwaukee, Wis.

85,936.—DREDGE CHUCK.—Daniel Keller, Baltimore, Md.

85,937.—WARMING SLEIGHS.—F. D. Kennedy, Albany, N. Y.

85,938.—SPRING FOR FURNITURE. — J. M. Kirkpatrick, Utica, Ohio.

85,939.—FLOORING CLAMP.—Francis G. Lafayette, Middletown, Ohio.

85,940. — STEAM CYLINDER. — Joah Lawson, Allegheny City, Pa.

85,941.—SAW SET.—Samuel F. Leach, Bangor, Me., assignor to himself and Ebenezer W. Elder.

85,942.—WASHING MACHINE. — William Leighty, Ebensburgh, Pa.

85,943.—WASHING MACHINE.—P. H. Lewis, Boston, Mass.

85,944.—MACHINE FOR DRYING HAIR.—Thomas Malley, Allegheny City, Pa.

85,945.—VULCANIZABLE COMPOUND TO IMITATE HORN, HARD RUBBER, ETC.—Frank Marquard, Newburyport, Mass., assignor to Vulcanized Wood Company.

85,946.—CARRIAGE CURTAIN BUTTON.—Nathan F. Mathewson, Barrington, R. I.

85,947.—WAGON BODY.—J. C. McFerran and A. P. Blunt, Washington, D. C.

85,948.—MACHINE FOR DRESSING MILLSTONES.—Watson A. McGlaughlin, Greenland, Pa.

85,949.—MUZZLE FOR SHOT GUNS.—James A. McKenzie, Galesburg, Ill.

85,950.—SLEEPING CAR.—C. C. Millar, Savannah, Ga.

85,951.—HOUSE-MOVING TRUCK.—William Millikan, Thorntown, Ind.

85,952.—HOISTING APPARATUS.—John H. Mills, Boston, Mass.

85,953.—WINDOW SHADE TASSEL CLIP.—Frederick Muller, Boston, Mass.

85,954.—METHOD OF REMOVING AND PROTECTING STORES IN CASE OF FIRE.—J. Hubert Page, Whitewater, Wis.

85,955.—MACHINE FOR DEFECATING AND BLEACHING CANE JUICE.—Philippe Paille, St. James Parish, La.

55,956.—HOLDER FOR BROOM AND BRUSH HANDLES.—Frederic S. Pinkham, Boston, assignor to himself and Edward Foster, Middleborough, Mass.

85,957.—REVOLVING COULTER.—R. L. Pitcher and R. Ellwood, Sycamore, Ill.

85,958.—CONVERTING IRON INTO STEEL.—Edward Richard Playle, Jersey City, N. J.

85,959.—PEN.—John T. Price, Arrow Rock, Mo.

85,960.—BED BOTTOM.—Alexander M. PUGH, Bucyrus, Ohio.

85,961.—METHOD OF ATTACHING RUBBER TO PENCILS.—Joseph Reckendorfer, New York city.

85,962.—QUARTZ CRUSHER.—Geo. C. Reeves, Blackhawk, Colorado Territory.

85,963.—STEAM SAFETY VALVE.—George Wm. Richardson, Troy, N. Y.

85,964.—HAT FINISHING MACHINE. — John C. Richardson, Newark, N. J.

85,965.—AUXILIARY KEY BOARD FOR PIANOS, ETC.—Theodule J. V. Roz, New York city.

85,966.—SEED DRILL.—Arnold Rutenfranz, Hammondstown, Ill.

85,967.—CHURN.—Cyrus W. Saladee, Newark, Ohio.

85,968.—CORN CULTIVATOR.—Samuel B. Shank, Manor township, Pa.

85,969.—SHUTTLE FOR LOOM.—Agustus Simpson, Cumberland, R. I., assignor to himself and S. S. Cook.

85,970.—CHURN AND BUTTER WORKER COMBINED.—Charles H. Smith, Boston, Mass.

85,971.—PLOW COLTER.—F. F. Smith (assignor to himself and the Collins Company), Collinsville, Conn.

85,972.—GAS GENERATOR.—J. H. Steiner, Kansas city, Mo.

85,973.—SASH LOCK.—Wm. A Sublett, San Francisco, Cal.

85,974.—THRESHING MACHINE.—J. T. Thornton, Elmira. Ill. Antedated Jan. 6, 1869.

85,975.—DOFFER FOR CARDING ENGINES.—Benj. D. Wheat, Mount Carmel, Ill.

85,976.—CARRIAGE KNOB.—E. S. Wheeler (assignor to himself and J. E. Wheeler), Westport, Conn.

85,977.—HINGE.—Alex. Whelan, (assignor to himself and Jos. W. Parrish), Washington, D. C.

85,978.—CONSTRUCTION OF SAFES.—F. H. Williams, Syracuse, N. Y.

85,979.—CAR COUPLING.—J. T. Wilson (assignor to himself and Frank Rahm), Pittsburgh, Pa.

85,980.—SPRING BED BOTTOM.—Seth Winslow, Charlestown, Mass.

85,981.—LOOM.—John C. Wood, Conshohocken, Pa.

85,982.—CORN PLOW AND MARKER COMBINED—David Wyant, West Lodi, Ohio.

85,983.—MACHINE FOR HEADING BOLTS.—J. R. Abbe, Providence, R. I.

85,984.—SUGAR-CANE MILL.—Wm. Aikin and Wm. Bennett said Bennett as administrator of the estate of J. R. Gates, deceased, (assignors to J. F. Pearson and Wm. Aikin), Louisville, Ky.

85,985.—WATER METER.—A. M. Almqvist and F. W. Ofeldt (assignors to themselves and Thomas Fitzsimmons), New York city.

85,986.—STOVEPIPE SHELF.—S. J. Anderson, Cazenovia, N. Y.

85,987.—CAR BRAKE.—Jas. H. Beatty, Franklin, Pa.

85,988.—PACKING FOR STEAM PISTON AND OTHER RODS.—Henry Bertrand and Francois Velut, Paris, France.

85,989.—CONSTRUCTION OF BOOTS.—L. R. Blake, Boston, Mass.

85,990.—GEOGRAPHIC GAME.—Levi Branson, Raleigh, N. C.

85,991.—COMBINED RULE AND PROTRACTOR.—R. A. Briggs (assignor to Edwy E. Hammond), New York city.

85,992.—GRAIN SEPARATOR.—George E. Bringman, Gettysburg, Pa.

85,993.—STRAW CUTTER.—C. H. Brown, Bloomingburg, N. Y.

85,994.—POTATO DIGGER.—Jacob Brown, Hamlin, Mich.

85,995.—SYRINGE.—C. W. Buffon, Vinton, Iowa.

85,996.—GYMNASTIC APPARATUS.—D. P. Butler, Boston, Mass.

85,997.—TOOL FOR SHARPENING THE CALKS OF HORSE SHOES.—Orren E. Butler, Stephen P. Dunham, and Geo. K. Wann, Marshalltown, Iowa.

85,998.—MEAT SMOKING APPARATUS.—R. T. Burnett, New York city.

85,999.—BREECH LOADING FIRE-ARM.— Henry Carter and Geo. H. Edwards, Dempsey street, Stepney, England.

86,000.—SLED BRAKE.—Frank A. Clark, New Sharon, Me.

86,001.—DRILLING AND BOLT TAPPING MACHINE.—Chas. W. Coe, Fentonville, Mich.

86,002.—CHURN.—J. B. Coffmann, New Richmond, assignor to himself, R. B. Wilson, and H. B. Sinks, Cincinnati, Ohio.

86,003.—CULTIVATOR.—J. H. Coleman, Columbia, Mo.

86,004.—MANUFACTURE OF WROUGHT IRON.—T. C. Coleman, Louisville, Ky.

86,005.—PERMUTATION LOCK.—G. W. Dana, Racine, Wis.

86,006.—HUB BORING MACHINE.—F. W. Dexter, Randolph, N. Y.

86,007.—BRAKE BLOCK HOLDER.—A. W. Dorr, Lake Valley, Cal.

86,008.—TEA KETTLE.—J. H. Downing, Healdsburg, Cal.

86,009.—LUBRICATING CUP FOR STEAM AND OTHER ENGINERY.—Isidore Dreyfus, New York city.

86,010.—MACHINE FOR GRINDING THE CUTTERS OF MOWING MACHINES.—Milton Fowks, Leeds, N. Y.

86,011.—RAILWAY CAR COUPLING.—Wm. H. Hall, Malone, N. Y.

86,012.—MANUFACTURE OF PRINTING AND WRITING PAPER.—W. W. Harding, Philadelphia, Pa.

86,013.—WASH BOILER.—W. D. Hillis, Elgin, Ill.

86,014.—HORSE SHOE.—H. S. Hitner, Marble Hall, Pa.

86,015.—MACHINE FOR DRESSING AND SHAPING STONE.—J. E. Holmes, New York city.

86,016.—INSTRUMENT FOR TREATING GUN-SHOT WOUNDS AND EXTRACTING BULLETS.—S. J. Howell, Orange, Mass.

86,017.—BASE-BURNING STOVE.—Zebulon Hunt, Hudson, N. Y.

86,018.—CEMENT FOR MAKING A WATER TIGHT JOINT IN COPING, ROOFING, ETC.—Jas. Judge, New York city.

86,019.—COMBINED SOWER AND CULTIVATOR.—H. C. Kellogg, Quasqueton, Iowa. Antedated Dec. 22, 1868.

86,020.—STOP COCK.—H. P. Kreiner, Berlin, Prussia, assignor to P. F. Kreiner, New York city.

86,021.—MANUFACTURE OF CURVED ELECTROTYPE AND STEREOTYPE PLATES.—Henry Lovejoy, Henry W. Lovejoy, and James H. Ferguson, New York city.

86,022.—REED FOR MUSICAL INSTRUMENTS.—R. R. Martino, New York city.

86,023.—BEE-HIVE.—Calvin R. C. Masten and Abram D. Van Vlack, Pleasant Valley, N. Y.

86,024.—HYDROCARBON BURNER.—Noeal May and H. F. Stivers, San Francisco, Cal.

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86,025.—WOOD PAVEMENT.—H. G. McGonegal, New York city.
86,026.—SEEDING MACHINE.—D. E. McSherry, Dayton, Ohio.
86,027.—GAS REGULATOR.—S. P. Mervine, Jr., Philadelphia, Pa.
86,028.—METALLIC COLUMN.—Richard Montgomery, New York city.
86,029.—TIRE FOR WAGONS.—B. F. Morey, Clinton, Ind.
86,030.—INJECTOR.—Alexander Morton, Glasgow, Scotland.
86,031.—SKATING FLOOR.—W. S. Nelson, St. Louis, Mo.
86,032.—BRICK MACHINE.—David Packard, St. Joseph, Mo.
86,033.—KNITTING MACHINE.—G. M. Patten, Bath, Me.
86,034.—SASH BALANCE.—Treat T. Prosser, Chicago, Ill., assignor to himself, G. W. Gillet, and G. H. Rozet.
86,035.—FIRE BLOWER.—A. J. Redway (assignor to Redway and Burton), Cincinnati, Ohio.
86,036.—WAGON.—J. H. Sawyer, Troy, Pa. Antedated January 11, 1869.
86,037.—BEE HIVE.—B. F. See, Monroe, Ohio.
86,038.—SHEET METAL CAN.—C. Seimel, Brooklyn, N. Y.
86,039.—MILK CAN.—A. C. Shorte and H. B. Todd, Plymouth, Conn.
86,040.—COMPOUND FOR PRESERVING FISH, MEAT, ETC.—Thomas Sim. Charleston, S. C.
86,041.—GASOLINE COOK STOVE.—J. D. Spang, Dayton, Ohio.
86,042.—OMNIBUS.—H. M. Stow, San Francisco, Cal.
86,043.—STEERING APPARATUS.—N. L. Tomlinson, New York city.
86,044.—CURTAIN FIXTURE.—L. A. Tripp and S. M. Boyd, New York city.
86,045.—PEACH CUTTER.—J. T. Vaughn, Griffin, Ga.
86,046.—APPARATUS FOR GENERATING HEAT BY FRICTION.—Pedro Vera, Bogota, United States of Colombia.
86,047.—INDIGO DYE.—T. Weber, Alton, Ill., assignor to J. G. Sargent.
86,048.—IMPLEMENT.—Charles Wetzler, Chicago, Ill.
86,049.—COMBINED BOOT HEEL AND SPUR.—C. F. Woodruff, Newbern, Tenn., assignor to himself and J. C. Pinner.
86,050.—REFINING AND PURIFYING IRON BY MEANS OF FLUXES INTRODUCED BY SUCTION.—J. Absterdam, New York city.
86,051.—REEFING SAILS.—H. R. Atwood, Chelsea, Mass.
86,052.—BRAKE FOR SLEDS.—R. Ayres, Vienna, N. J.
86,053.—RAILWAY RAIL CHAIR.—D. D. Bigelow, White House, N. J.
86,054.—SHOE PEGGING AND NAILING MACHINE.—Lyman R. Blake, Boston, Mass.
86,055.—HAND-POWER LOOM.—G. A. Brown and Julia A. Hunt, Oakalla, Ill.
86,056.—MANUFACTURE OF IRON.—J. Burt, Detroit, Mich.
86,057.—SEWING MACHINE FOR SEWING PARALLEL SEAMS.—F. P. Canfield, Cambridgeport, assignor to himself and J. F. Fales, Walpole, Mass.
86,058.—PAPER "SATINING" MACHINE.—Thomas Christy, New York city.
86,059.—MACHINE FOR MAKING CANDLES.—E. Cowles, Hounslow, Kingdom of Great Britain and Ireland.
86,060.—MECHANICAL MOVEMENT.—F. Creamer, Brooklyn, N. Y., assignor to himself and T. W. Ladd, New York city.
86,061.—HORSE POWER.—S. W. Davis, Brasher Falls, N. Y. Antedated January 8, 1869.
86,062.—SASH HOLDER.—W. A. Devon, Port Richmond, N. Y. Antedated January 9, 1869.
86,063.—BEE HIVE.—T. S. Engledow, Cedar Falls, Iowa.
86,064.—PRINTING PRESS.—W. H. Forbush, Buffalo, N. Y.
86,065.—STEERING APPARATUS.—Welcome Gilkey, Watertown, Mass.
86,066.—SALT TROUGH FOR CATTLE.—Timothy Gladding, East Berlin, Conn.
86,067.—PISTON STEAM VALVE.—Robert C. Gray and William B. Brittingham, La Fayette, Ind.
86,068.—SEED AND GRAIN DRILL.—D. W. Hamaker, Union Star, Mo.
86,069.—PLATE OR GRATE FOR BASE-BURNING STOVES.—L. W. Harwood and Charles D. Newton, Troy, N. Y., assignors to Elihu Hosford, Chicago, Ill.
86,070.—VALVE GEAR OF STEAM ENGINES.—Anton Heupel, John Reinhardt, and S. G. Votteler, Philadelphia, Pa. Antedated January 8, 1869.
86,071.—SUBMERGED FORCE PUMP.—C. C. Hiatt, Ridgeville, Ind.
86,072.—BASE-BURNING STOVE.—Elihu Hosford, Chicago, Ill.
86,073.—BASE-BURNING WOOD STOVE.—E. Hosford, Chicago, Ill.
86,074.—BED PLATE FOR BASE-BURNING WOOD STOVE.—C. D. Newton, Troy, N. Y.
86,075.—STEM-WINDING WATCH.—C. E. Jacot, New York city.
86,076.—HYDRANT.—E. T. Jenkins, Ravenswood, N. Y.
86,077.—WHEELBARROW.—C. C. Johnson, Springfield, Vt.
86,078.—MACHINE FOR BURRING WOOL.—D. L. Jones and G. T. Jones, Philadelphia, Pa.
86,079.—PLOW.—J. H. Jones and H. P. Jones, Herndon, Ga.
86,080.—HORSE HAY RAKE.—Wm. S. Kincaid, Leavenworth county, Kansas.
86,081.—FENCE BUILDER.—J. M. Kirkpatrick, Utica, Ohio.
86,082.—FASTENING FOR COVERS OR STOPPERS OF BOTTLES, JARS, ETC.—F. Klee, Brooklyn, E. D., N. Y.
86,083.—CHURN.—August Kohler and M. W. Wilson, Noblesville, Ind.
86,084.—LAMP EXTINGUISHER.—C. Lanzendorfer, Chicago, Ill.
86,085.—CASE FOR TURBINE WATER WHEELS.—T. Leffel (assignor to himself and H. C. Barnett), Springfield, Ohio.
86,086.—PROPELLER.—A. C. Loud, San Francisco, Cal.
86,087.—LAND ROLLER.—H. P. Manley, Ellsworth, N. Y.
86,088.—GALVANIC PLATE FOR REMEDIAL PURPOSES.—Chas. Maray, New York city. Antedated January 11, 1869.
86,089.—FRUIT JAR.—J. L. Mason, New York city.
86,090.—FRUIT JAR.—J. L. Mason, New York city.
86,091.—FIREARM.—L. A. Merriam, New York city.
86,092.—STAIR ROD.—W. T. Mersereau, Newark, N. J.
86,093.—RAIL FOR RAILWAYS.—J. H. Moore, Chicago, Ill.
86,094.—CHURN.—G. W. Morter and E. C. Packer, Alliance, Ohio.
86,095.—CLOTHES DRYER.—C. R. Mumma, administrator of the estate of J. Mumma, deceased, Middletown, Ohio.
86,096.—LOZENGE AND CRACKER MACHINE.—Charles A. Oehl, Portsmouth, N. H.
86,097.—GUM SCRUBBER.—Joseph Old, Reading, Pa.
86,098.—MECHANICAL ADJUSTMENT. — Wilbur F. Parker, Meriden, Conn.
86,099.—FANNING MILL.—J. F. Pool, Monroe, Wis.
86,100.—CURTAIN FIXTURE. — Silas S. Putnam, Dorchester, Mass.
86,101.—LEAD PENCIL.—Joseph Reckendorfer, New York city.
86,102.—STONE SAWING MACHINE.—Abraham Rothwell, Baltimore county, Md.
86,103.—PROCESS OF TREATING PAPER AND WOVEN FABRICS, TO PRODUCE WATERPROOF SHEETS AND SLABS.—John Scoffern, Finsbury, assignor to Henry Beaufort Sears, Liverpool, England.
86,104.—SHEATHING AND COATING SHIPS' BOTTOMS.—John Scoffern, Finsbury, assignor to Henry Beaufort Sears, Liverpool, England.
86,105.—COMBINED CORN PLANTER AND CULTIVATOR.—William Scott, High Banks, Ind.
86,106.—MODE OF RENDERING SAFES, VAULTS, AND OTHER STRUCTURES FIREPROOF.—Benjamin Sherwood, Brooklyn, N. Y.
86,107.—REST FOR CARRIAGE TOP.—William O. Snyder, Philadelphia, Pa.
86,108.—COOKING UTENSIL.—Stephen Spoor, Phelps, N. Y.
86,109.—COMBINED HAY ELEVATOR AND MANURE DRAG.—P. H. Stauffer, Lehighton, Pa., assignor to himself, Edward Maury, and William L. Lands.
86,110.—COMBINED CULTIVATOR AND MANURE DRAG.—P. H. Stauffer, Lehighton, Pa., assignor to himself, Edward Maury, and William L. Lands.
86,111.—STEAM PUMP.—Charles L. Stevens and Albert A. Denton, Galesburg, Ill.
86,112.—HARNESS SADDLE PAD.—Retire C. Sturges (assignor to the American Saddle Company), Boston, Mass.
86,113.—EXTENSION TABLE.—B. D. Sutlief, Wallingford, Conn.
86,114.—KEY.—Andreas Vang, Chicago, Ill., assignor to John Mackay.
86,115.—TUBS FOR DISTILLING ESSENTIAL OILS.—Barton P. Van Marter, Lyons, N. Y.
86,116.—ALARM CLOCK.—O. D. Warner (assignor to himself and S. M. Sutliff, Bristol, Conn.
86,117.—SWING BRIDGE.—Gustavus R. Winkler (assignor to Bernhardt Berndt, and Martha Winkler), Williamsport, Pa.
86,118.—LAMP.—Willard H. Smith, New York city, assignor to Francis C. Cantine, Orange, N. J. Antedated January 6, 1869.

REISSUES.

36,843.—HARVESTER.—Dated November 4, 1862; reissue 3,267.—Samuel Johnston, Syracuse, N. Y.
10,903.—CLAPBOARD JOINT.—Dated May 16, 1854; reissue 1,541, dated September 22, 1863; extended seven years; reissue 3,268.—William Baker, Utica, N. Y.
83,383.—HOT BLAST FURNACE.—Dated October 27, 1868; reissue 3,269.—P. Hoop, Jr., and R. Hoop, Berlin Cross Roads, Ohio.
28,440.—CORN SHELLER.—Dated May 22, 1860; reissue 3,270.—J. G. Putnam and J. Schieffelin, Jr., Tioga, Pa., assignees of J. G. Putnam.
25,278.—TINMAN'S MACHINE.—Dated August 30, 1859; reissue 3,271.—C. H. Raymond, Southington, Conn.
14,368.—METHOD OF BOTTLING FLUIDS UNDER GASEOUS PRESSURE.—Dated March 4, 1856; reissue 3,175, dated October 27, 1868; reissue 3,272.—Paul Schmitt, New York city, assignee of Jane Quantin and H. A. Pintard, administrators of Alphonse Quantin, deceased.
57,399.—CARPET BAG FRAME.—Dated August 21, 1866; reissue 3,273.—Albert Sonnekalb and J. W. Lieb, Newark, N. J.
72,110.—PAVEMENT.—Dated December 10, 1867; reissue 3,274.—H. M. Stow, San Francisco, Cal.
40,649.—ASPHALTIC CEMENT.—Dated November 17, 1863; reissue 3,275.—Isaac Straub, Kenton county Ky., administrator of the estate of Abraham Straub, deceased.

DESIGNS.

3,342.—INKSTAND.—T. S. Hudson, East Cambridge, Mass.
3,343.—FLOOR OIL CLOTH PATTERN.—J. Hutchison, Newark, N. J., assignor to E. C. Sampson, New York city.
3,344 and 3,345.—FLOOR OIL CLOTH PATTERN.—C. T. Meyer, Bergen, N. J., assignor to E. C. Sampson, New York city. Two Patents.
3,346.—STOVE.—Apollos Richmond, Brooklyn, and S. G. Richmond, Norwich, Conn.
3,347.—COOK'S STOVE.—A. Richmond, Brooklyn, and S. G. Richmond, Norwich, Conn.
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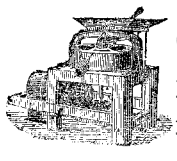
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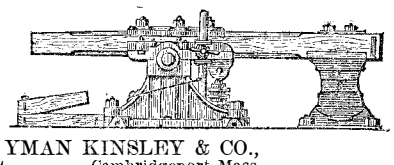
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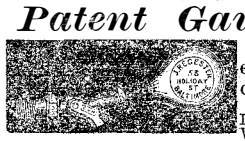

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U. S. PATENT OFFICE,
WASHINGTON, D. C., Jan. 4, 1869.

James Emerson, of Lowell, Mass., having petitioned for the extension of a patent granted him on the 28th day of August, 1855, for an improvement in Ships' Windlasses, it is ordered that said petition be heard at this office on the 29th day of March next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Jan. 4th, 1869.

Charles Wilhelm and Anna Catharine Wilhelm, of Philadelphia, Pa., having petitioned for the extension of a patent granted them on the 3d day April, 1855, for an improvement in Protector for Lamp Shades, it is ordered that said petition be heard at this office on the 22d day of March next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Jan. 5th, 1869.

Chester Van Horn, of Springfield, Mass., having petitioned for the extension of a patent granted him on the 17th day of April, 1855, for an improvement in Slide Rest for Lathes, it is ordered that said petition be heard at the office on the 29th day of March next.

Any person may expose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Jan. 5th, 1869.

Aaron Woodman, of New York city, administrator of Moses Thompson, deceased, having petitioned for the extension of a patent granted the said Moses Thompson, on the 10th day of April, 1855, for an improvement in Furnaces for Burning Wet Fuel, it is ordered that said petition be heard at this office on the 29th day of March next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Jan. 8th, 1869.

E. Harry Smith, of Bergen, N. J., having petitioned for the extension of a patent granted him on the 17th day of April, 1855, for an improvement in Sewing Machines, it is ordered that said petition be heard at this office on the 29th day of March next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Jan. 11, 1869.

Charles H. Fondé, of Mobile, Ala., having petitioned for the extension of a patent granted him on the 17th day of April, 1855, for an improvement in Dredging Machines, it is ordered that said petition be heard at this office on the 29th day of March next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Jan. 13th, 1869.

Finley Latta, of Cincinnati, Ohio, administrator of the estate of A. B. Latta, deceased, having petitioned for the extension of a patent granted the said A. B. Latta on the 10th day of April, 1855, for an improvement in Steam Generators, it is ordered that said petition be heard at this office on the 29th day of March next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Jan. 14, 1869.

Joseph Peabody and S. E. Peabody, of Salem, Mass., and Francis Peabody, of Danvers, Mass., executors of the estate of Francis Peabody, deceased, having petitioned for the extension of a patent granted the said Francis Peabody, on the 17th day of April, 1855, for an improvement in Hay-making Machines, it is ordered that said petition be heard at this office on the 29th day of March next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Jan. 15, 1869.

Walter H. Forbush, of Buffalo, N. Y., Administrator of the Estate of E. B. Forbush, deceased, having petitioned for the extension of a patent granted the said E. B. Forbush on the 17th day of April, 1855, reissued the 26th of April, 1859, and again reissued in five divisions numbered respectively 1967, 1968, 1969, 1970, and 1971, the 23d day of May, 1865, for an improvement in Grain and Grass Harvesters, it is ordered that said petition be heard at this office on the 29th day of March next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.

ELISHA FOOTE, Commissioner of Patents.

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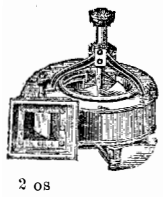

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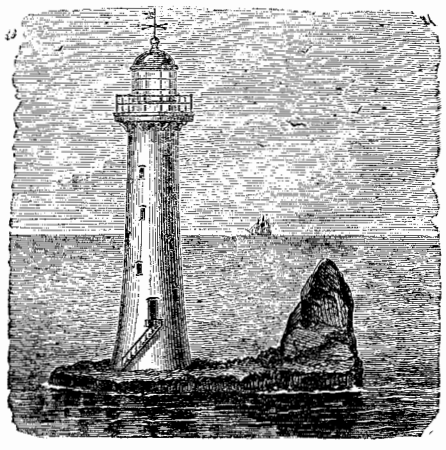

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